GULF OF MEXICO PLANKTON INVESTIGATIONS, 1951-53



UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE

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GULF OF MEXICO PLANKTON INVESTIGATIONS: 1951-53

by

Edgar L. Arnold, Jr. Fishery Research Biologist Gulf Fishery Investigations Bureau of Commercial Fisheries Galveston, Texas

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1951-53

The Gulf of Mexico, despite its economic importance, is one of the world's least known major bodies of water, in regard both to mass water movements and to the abundance, distribution, ranges, and life histories of many species of fishes found within its boundaries. With the exception of several cruises of the Blake and Mabel Taylor in the late 1880's, the relatively small accumulation of scientific knowledge was confined largely to inshore areas. Although supporting a number of fisheries for many years, notably those for shrimp, snappers, oysters, and menhaden, the total fishery production of the Gulf has been considerably less than would normally be expected from an area of approximately 700,000 square miles. Recognizing the need for a more comprehensive general knowledge, it was decided to make a general oceanographic survey when the Gulf Fishery Investigations was established in the summer of 1950 at Galveston, Texas, by the Fish and Wildlife Service. The primary objective was to determine the spawning areas of various fishes. Studying the distribution of their eggs and larvae by means of plankton tows offered the best method for attaining this objective.

Data are presented in this report on the offshore plankton collections made in the Gulf from the M/V Alaska, research vessel of the Gulf Fishery Investigations. To aid in the comparison of data, the Gulf was divided arbitrarily into the eight subareas shown in figure 1 (see page 2). Ten cruises were made from March 1951 to July 1953. Originally it was planned to cover the entire Gulf annually in a series of three cruises, repeated each year. Unfortunately, the requisitioning of the Alaska for 24 weeks of sea-time disrupted the planned continuity.

As the distance between stations in the basic pattern (approximately 40 miles north and south, 100 miles east and west) seemed too great for obtaining representative plankton collections, I designed a sampler that could be towed at cruising speed between stations. It consisted essentially of a removable "Monel" wire-cloth mesh net housed within a "Monel" tube. Details of construction are given in Fish and Wildlife Service Special Scientific Report--Fisheries No. 88. Designated as model G-IA, the sampler was fabricated and ready for use prior to the start of the second coverage of the Gulf (cruise 4-2A) in January 1952, and was operated successfully until inactivation of the <u>Alaska</u> in June 1953.

Continuing with the wire-cloth mesh principle, an all-metal net was designed and fabricated for making tows on station. Fundamentally a modified larger version of the G-IA model, this net was designated as model G-III, and is described in detail in the Special Scientific Report already cited.

It seemed logical to assume that the G-III sampler, towed for the same period of time at 4 to 5 knots, and with the same net opening, would catch substantially more plankton than a half-meter silk net, towed at one-fourth the speed. Moreover, we hoped that the increased speed, plus an opening unobstructed by a towing bridle, would tesult in the capture of the more agile planktonic forms.

Collecting operations in January 1952, during cruise 4-2A, afforded the first opportunity to compare the catching abilities of the G-III sampler and a conventional half-meter silk net. I used numbers and sizes of fish larvae $\frac{1}{2}$ as a basis for comparison.

Ten tows at 4 to 5 knots were made with the G-III sampler, 23 tows at approximately 1 knot were made with the half-meter net. All tows were of 30-minute duration. Both nets were fished horizontally, either at or within 10 meters of the surface. One G-III tow that yielded 959 larvae was considered atypical and was not used in the comparison. In the 9 remaining tows, the G-III net captured 1,334 fish larvae as

1/ The term "larvae", used in this paper, includes all immature forms.

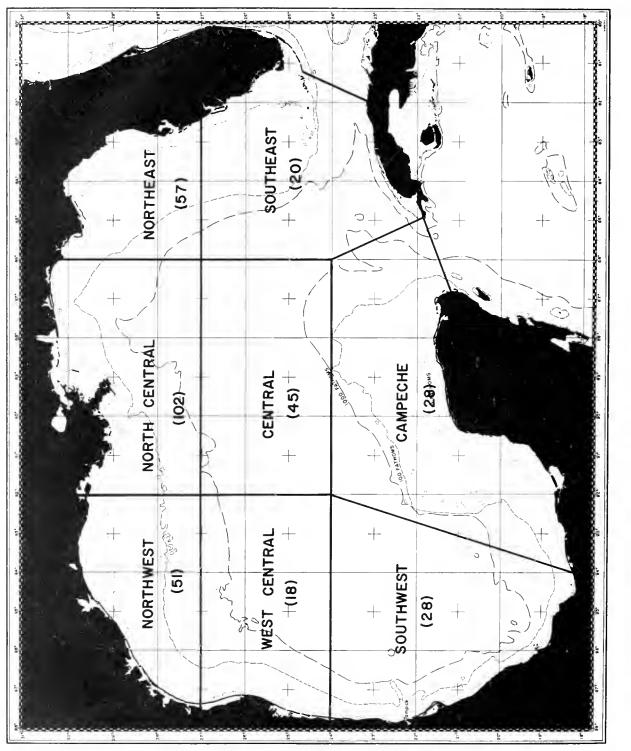


Figure 1.--Subareas into which the Gulf of Mexico was divided for comparison of offshore plankton data. Numbers in parenthesis represent the number of plankton tows made in each area. compared to 414 larvae taken in 23 tows of the silk net. As shown in figure 2, the G-III samples contained larger specimens, as well as over three times the number of larvae. Contrary to what might be expected from the much greater towing speed and metal meshes of the G-III net, I found no difference in the condition of the catches of the two nets.

As a result of these findings and because of its other advantages (durability and ease of cleaning), the G-III sampler was used exclusively on subsequent cruises.

During the period of field work aboard the <u>Alaska</u>, a total of 449 tows were made with different types of gear, as follows:

Half-meter No. 10			
silk net		94	tows
One-meter No. 10 silk net.	•	9	tows
G-III Monel net No. 1			
mesh	•	131	tows
		215	
G-IA Monel net No. 1 mesh.		215	TOWS

Samples were first sorted for fish eggs and larvae. Prior to volume determination all gross forms (medusae, sargassum weed, etc.) were removed.

Volumes were obtained after the first four cruises by the following procedure:

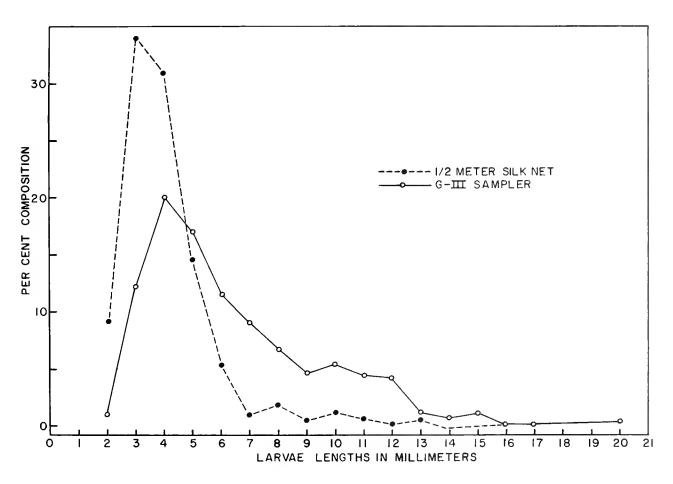


Figure 2.--Length frequencies by percent of larvae taken by a conventional half-meter silk net towed at one knot compared with those taken by the G-III sampler towed at 4 to 5 knots during Cruise 4-2A in January 1952.

- Sample poured into graduate cylinder and reading noted to nearest milliliter.
- Solution separated from plankton by force-filtering solution through a No. 1 Wratten disc filter by means of a vacuum-pump attachment.
- 3. Filtrate poured back into graduate and reading noted.
- 4. Volume is difference between the two readings.

For the first four cruises, however, we determined volumes by fractioning and centrifuging. To adjust these values to conform with those obtained by filtration, we ran, in duplicate, a series of plankton samples of different volume ranges through both methods to obtain the necessary conversion factors. All plankton volumes given in the tables are based on the first method described.

The volumes of water strained, as tabulated, were calculated from readings of the four Atlas current meters which were used throughout the Alaska cruises. As two meters were used with the G-III net on only one cruise, the readings for all quantitative hauls of this net were based on readings from the rear meter. Calibrations of the meters were obtained upon completion of field work by making duplicate tows in opposite directions at different speeds over a 4,500-foot course in calm water. The results of these calibrating runs which were used in the present report are as follows:

Meter No.	Liters per revolution
109	3.604
112	3.100
175	2.821
176	2.575

The following tables of data and their accompanying charts are tabulated according to gear and cruise. G-III hauls are numbered according to station. The results of G-III oblique hauls during cruise 5-2C (table 8) are in the same order of magnitude as those of horizontal tows, and thus received no special treatment.

In spite of the diversity of towing techniques and gear, the distribution of plankton by volume revealed a distinct pattern (tables 16 and 17), with the greater abundance appearing in catches made over the Continental Shelf.

In table 18 the catches of the two metal nets are compared on a quantitative basis. The G-III net, with its half-meter opening, caught substantially more of the active swimmers, but both models captured inactive forms (eggs) in nearly the same ratio. The table also points out the abrupt decrease in plankton abundance as the vessel moved seaward from waters over the Continental Shelf.

In considering the data presented in this report, it should be kept in mind that because of the emphasis placed on hydrography during the survey, and the relatively deep draft of the Alaska, few stations were taken in shallow water. Limited plankton collections subsequently made in shallow waters from smaller vessels in the vicinity of Galveston Island revealed a much higher concentration of plankton, especially in numbers of fish larvae, than appeared in the Alaska catches from farther offshore. It is probable, therefore, that intensive shallow-water collecting would reveal a higher potential of biological productivity for the inshore area of the Gulf than may be inferred from these tables.

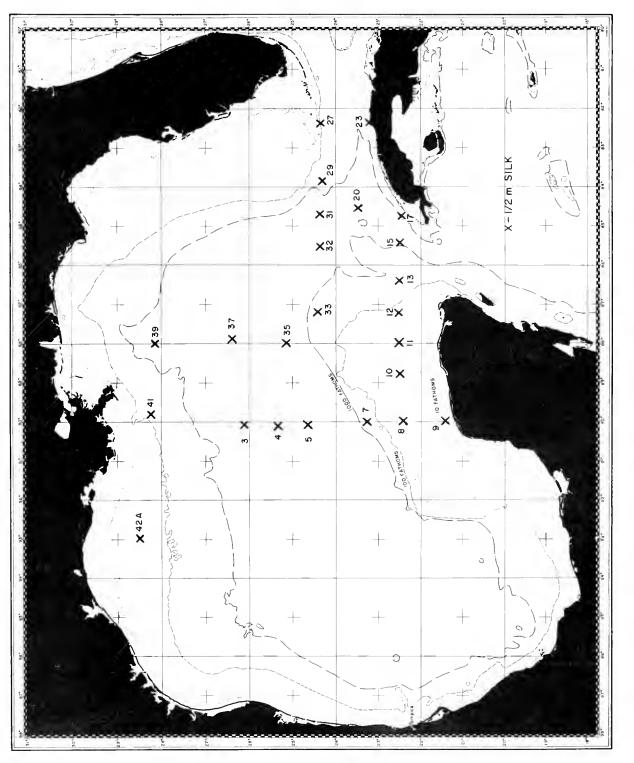


Figure 3.--Location of plankton tows made during Cruise 1-1A, April-May, 1951. Numbers identify stations.

Station		ition	Sub-	Date	Time (start)		Plankton	
	N. Lat.	W. Long.	Area	1951	C. S. T.	Volume (ml)	Fish larvae	Fish eggs
3	26-0 8	90-05	С	JV 22	0100	5.0	26	0
4	25 - 20	90-07	С	IV 22	2000	8.0	0	7
5	2∐ ⊷] i0	90-07	С	IV-23	1110	14.5	27	6
7	23 - 15	90-00	Ca	IV-24	0345	1)+•0	67	7
8	22 25	90-00	Ca	TV-24	1032	17.0	1 36	19
9	21 - 25	90 - 00	Ca	IV-24	1920	4.5	32	68
10	22-30	88-46	Ca	IV -2 5	1300	9•0	69	42
11	22 - 30	88-00	Ca	IV 2 5	2145	15.0	155	78
12	22 - 30	87-14	Ca	IV - 26	0600	4.0	60	97
13	22-3 0	86 -2 5	Ca	IV - 26	1429	2.5	6	9
15	22 ~ 30	85 -2 5	Ca	IV -27	0830	3.0	4	5
17	22-28	84-45	SE	JV -27	1945	1.5	2	l
20	23– 28	84-32	SE	TV-28	0940	<1.0	2	0
23	23-11	82-24	SE	IV -29	0355	2.5	5	13
27	24-22	82-21i	SE	₩~3	1910	26.4	30	2
29	24-1 8	83-53	SE	V - 4	1000	11.5	4	6
31	24-22	84-44	SE	V-)4	2200	10.0	l	0
32	24-22	85-31	SE	v - 5	0840	4.5	1	0
33	24-25	87-14	С	V-6	0020	11.5	42	8
35	25 - 09	88-00	С	V - 6	1340	9•0	15	127
37	26-22	8 7- 55	С	V-7	0355	23.5	18	5
39	28-09	88-00	NC	V - 7	2 220	21.0	56	0
41	28-13	89-49	NC	V-8/9	2350	18.0	75	7
112A	2 ⁸ -30	93-00	IJW	V-10	0815	31.6	5 2	8

Table 1.--Station data, plankton volumes and numbers, Cruise 1-1A. (Half-meter net, half-hour surface tows)

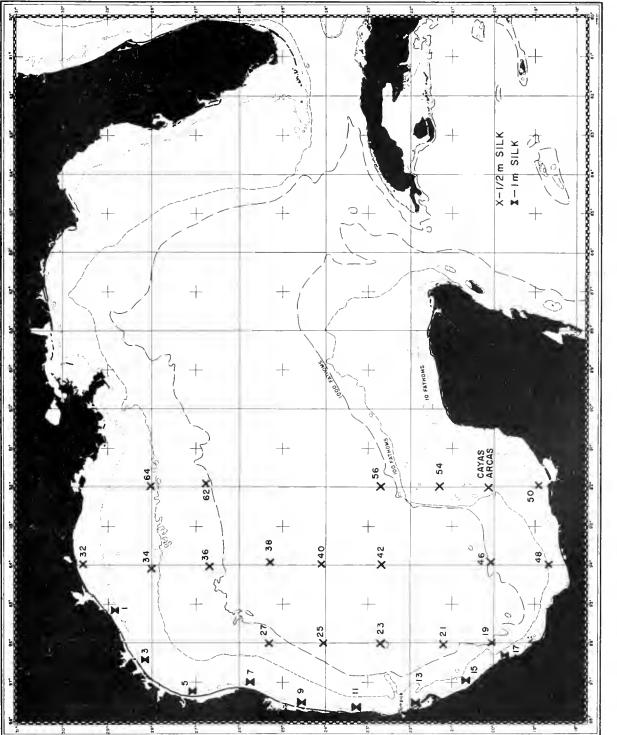


Figure 4.--Location of plankton tows made during Cruise 2-1B, June 1951. Numbers identify stations.

Table 2.--Station data, plankton volumes and numbers, Cruise 2-1B. (Half-meter net, 15-minute and half-hour surface tows)

Station	Pos	ition	Sub-	Date	Time (start)		Plankton		
	N. Iat.	W. Long.	Area	1951	C. S. T.	Volume (ml)	Fish Iarvae	Fish Eggs	
l	28-51	95-12	NW	VI-L	2245*	576.0	0	725	
3	28-09	96 - 26	NW	VI-5	0932	32.4	4	105	
5	27-04	97 -1 6	NW	VI-5	1940	94.7	2178	414	
7	25 - 45	97-00	WC	VI-6	0635	77.0	43	87	
9	24 - 33	97 - 31	MC.	VI-6	1755	57•4	596	3368	
11	23-18	97-38	SW	VI-7	0505	49•7	213	458	
13	21 - 53	97-34	SW	VI-7	1840	59 . 5	185	945	
15	20-41	96 - 58	SW	8-IV	0726	575.0	24	86	
17	19-43	96 - 20	SW	8 - IV	1756	59•5	113	202	

Half-meter net, 15-minute surface tows.

* 30 minutes

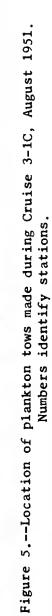
Half-meter net, half-hour surface tows.

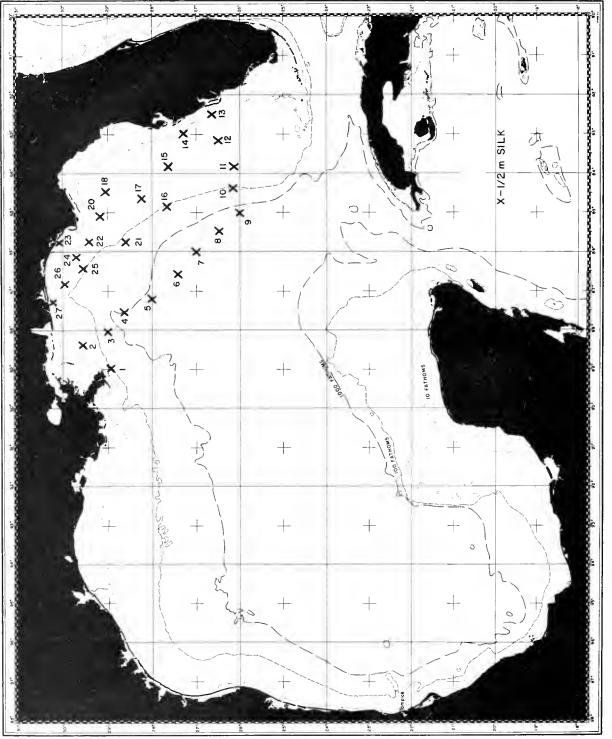
19	20-02	96-00	SW	VI-9	0810	5•5	11	58
21	21-15	96 - 01	SW	VI-9	2345	25.9	10	8
23	22-42	96-00	SW	A1-J0	1700	25.9	9	28
25	24-03	96-01	WC	VI-11	0800	3. 5	12	14
27	25- 20	96 - 00	WC	VI-11	2255*	25•5	10	25
32	29-34	94-00	NW	VI-19	0200*	92.3	588	39
34	28 CO	94-07	NW	VI-19	1515	21.0	10	34

TABLE 2 (Continued)

Station	on Position		Sub- Date		Time (start)	Plankton			
	No Lato	W. Long.	Area	1 951	C. S. T.	Volume (ml)	Fish Larvae	Fish Eggs	
36	26-41	95-04	WC	VI- 20	0630	15.0	14	5	
38	25-1 7	93-58	WC	VI-21	0625	15.5	11	1	
<u>4</u> 0	24-05	94-00	WC	VI-22	0405*	25.9	31	0	
42	22-l10	94-00	SW	VI-22	2220	31.6	42	14	
46	20-04	93 - 57	SW	VI-24	2020	25.5	22	0	
48	18 ≁ 40	94-00	SW	VI -2 5	0830	3.C	18	32	
50	18 -5 5	91-57	Ca	VI-26	0855	72.1	101	65	
as Arcas	20-10	92-00	Ca	VI - 27	0720	32.8	133	980	
54	2 1- 20	91- 58	Ca	VI-27	1 710	313.0	21	218	
56	22- 40	92- 00	Ca	VI-28	0640	15.0	9	9	
62	26-46	91 -5 5	с	VI=29	1 340	20 ₀ 0	27	14	
64	28-00	92-00	NW	VI-30	0030	66.2	51	138	

*15 minutes





Station		ition	Sub-	Date	Time (start)		Plankton	
	N. Lat.	W. Long.	Area	1 951	C. S. T.	Volume (ml)	Fish Larvae	Fish Eggs
1	28 53	89-00	NC	VIII-10	0300	68.6	21	4
2	29 - 33	88-23	NC	VIII-10	0945	91 . 6	3	10
3	29 - 00	88-01	NC	VIII-11	. 2213	314.0	0	0
4	28-41	87-30	NC	VIII-12	0805	57.4	15	62
5	28-00	87-12	NC	VIII-12	1810	33•3	2	0
6	2 7- 27	86-33	NC	VIII-13	0720	52.5	8	18
7	26 - 59	86-01	SE	VIII -1 3	21 35	45.6	12	l
8	26 29	85 - 29	SE	VIII-11	0940	47.1	12	4
9	26-00	85-00	SE	VIII-15	0 22 5	36.5	15	l
10	26-10	84-22	SE	VIII-15	0755	29•6	19	88
ш	26-09	83-50	SE	VIII -1 5	1340	28•7	7	49
12	26 - 31	83-10	SE	VIII-16	2045	28•5	52	471
13	26 - 39	82 - 31	SE	VIII-17	0240	59.4	7 8	38
14	2 7-1 8	82-58	NE	VIII-17	1050	20 . 0	30	83
15	27 - 38	83-51	NE	VIII-17	1755	34.2	15	13
16	27-42	84-51	NE	VIII-18	0100	32.0	11.	20
17	28 - 15	84-41	NE	VIII-18	0635	36.5	19	38
18	29 - 03	84-27	NE	VIII-18	13 50	2•5	5	6
20	29 - 11	85 - 07	NE	VIII-18	1855	22.0	20	115

Table 3.--Station data, plankton volumes and numbers, Cruise 3-1C. (Half-meter net, half-hour surface tows)

TABLE 3 (Continued)

Station	Pos	ition	Sub-	Date	Time (start)		Plankton	
	N. Lat.	W. Long.	Area	1951	C. S. T.	Volume (ml)	Fish Larvae	Fish Eggs
21	28-46	85-46	NE	VIII-19	0210	58.0	5	12
22	29 - 26	85-45	NE	VIII-19	0750	75.1	4	87
23	30 - 06	85-45	NE	VIII-19	1240	12.5	60	42
24	29-43	86-10	NC	VIII-20	1230	143.0	5	8
25	29 - 30	86-28	NC	VIII-20	1558	31.9	0	0
26	29-57	86-50	NC	VIII-20	1 930	360.0	l	0
27	30-15	87-17	NC	VIII-2]	. 0055	294•5	31	16

Station		sition	Sub-	Date	Time (start)		Plankton	
	N. Lat.	W. Long.	Area	1952	C. S. T.	Volume (ml)	Fish Larvae	Fish Eggs
l	26-46	92-00	WC	I - 9	1800	6.0	0	l
6	24-48	90 - 06	С	I -1 1	0900	2.4	l	2
7	24-17	89 - 37	С	I=11	2200	4.8	10	3
8	23 - 46	88-55	Ca	I-12	0635	5.0	29	3
9	23 20	88-23	Ca	I -1 2	1355	7.2	32	2
10	22-47	88-00	Ca	I-12	1945	3•5	13	8
11	22-20	87-31	Ca	I-13	0135	7.0	7	40
12	2 1- 52	87-05	Ca	I -1 3	0815	2.4	11	0
14	2 1-3 5	86-27	Ca	I - 13	2055	10.0	18	l
15	21-45	86-05	Ca	1-14	0245	2.6	16	0
16	2 1- 52	85 - 36	Ca	I-14	0915	2.0	3	l
17	21 - 54	85-23	Ca	1-14	1435	2.4	0	0
184	22-01	85 - 00	SE	I -1 5	1130	4.0	2	l
19	22-16	84-54	SE	I -1 5	1945	9.0	3	l
22	24-10	84-11	SE	I-16	2250	9.0	18	0
23	24-40	83 -5 2	SE	I -1 7	0 450	10.0	11.	2
30	23 13	82-22	SE	I-20	0530	8.0	山	10
31	23 - 16	83 - 11	SE	I ⇒2 2	1330	5.4	0	Ο.

Table 4.--Station data, plankton volumes and numbers, Cruise 4-2A. (Half-meter net, half-hour surface tows)

TABLE 4 (Continued)

Station		ition	Sub-	Date	Time (start)		Plankton	
	N. Lat.	W. Long.	Area	1952	C. S. T.	Volume (ml)	Fish Larvae	Fish Eggs
33	23 - 32	84 - 33	SE	I +23	0248	12.0	32	6
39	25 37	86 -1 4	С	I -2 5	0610	12.0	73	3
40	26-07	86 06	С	I -2 5	1500	4.0	2	0
41	27-01	85 - 58	NE	I - 26	0000	12.0	87	3
43	28-11	86-00	NE	1 - 26	1515	7 •0	0	6
կե	28 -12	86 - 45	NC	I -2 6	2318	12.1	25	7
45	28 - 03	87 - 27	NC	I - 27	0638	8•0	31	5

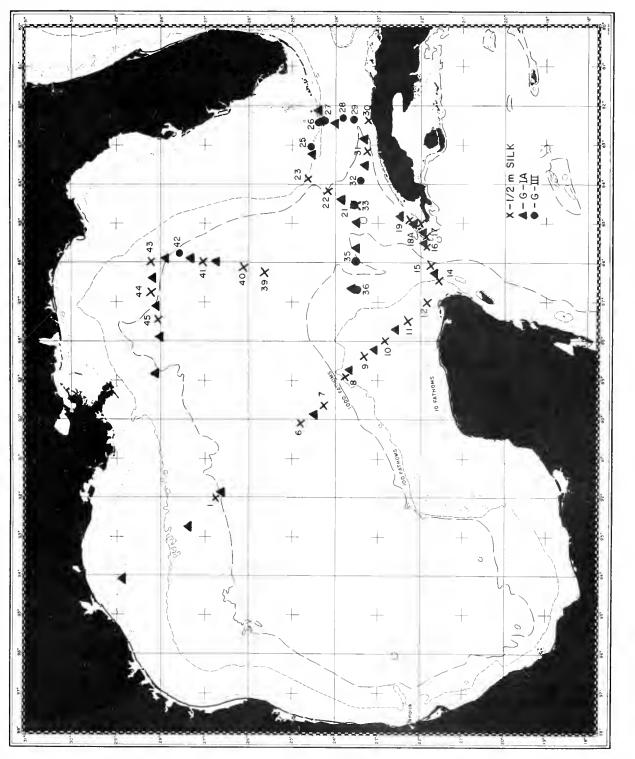




Table 5.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 4-2A.

-10 knots)
tows: 9-
of
speed
sampler;
(G-IA

		-poir	Sub-	Date	Time	Depth of	Volume water	Volume	Volume	Fish Larvae	Fish Eggs
z	Late	M. Long.	Area	1952	(C.S.T.)	tow (m.)	strained in m	(Tm)	ml/m) water	no./mJ water	no./mJ water
2	27-22	92 - 43	MN	19	0950-1250	<u>л</u> б	88 • 95	0•2	•002	• 022	• 000
2	26-37	91-50	MN	1 ~ 9	1825 - 2225	3-4	123 。 83	2 •0	•016	• 000	•000
~	24-30	89-52	C	I - I1	0 111- 0160	м	151.00	1. 0	•002	•040	• 026
~	23-38	88-44	පී	I-12	0630-0920	9	89 . 81	0°9	•010	•022	•089
	23-03	88 -1 3	පී	I-12	1 355 - 1805	Ś	122°45	2°U	•016	•073	•098
	22=33	87-lılı	평	I-12	1955-0000	5-6	125•65	2 . 0	• 016	• 000	• 000
	21-40	8 6-1 5	Ca	I-13	2050-2330	m	65.149	1 •0	•012	1 60°	• 000
	21 -5 3	85 - 30	පී	I-14	0925–1115	9	51 . 81	0.8	•015	• 000	•000
N	21-54	85 - 13	පී	I-14	1435 -1 640	6	55 ° 83	1•0	•018	• 000	• 000
2	22-06	84-59	SE	I-15	11,38-1710	7	59 - 68	0 . 8	•013	• 000	•000
2	22-29	84-50	SE	I=15	2005-2245	2-3	60.19	1 •0	•017	000	•000
~	23- 50	84-24	SE	I-16	1 520–1.950	ñ	90°16	0•8	•009	•000	•000
~	24 - 32	83-15	SE	I-17	0820-1005	9	36.11	0•8	•022	•000	• 000
~	24- 20	82-23	SE	I-17	1320-1740	7	87•65	3•0	•034	•103	• 000
(V	24-24	82-10	SE	I-19	0620-0920	7	53 . 38	4 . 2	•079	•225	460°

	Pos:	Position (mid_noint							4	Plankton	
Tow	of N. Lat.	of tow) t. W. Long.	Sub- Area	Date 1952	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volume ml/m ³ water	Fish Larvae no./m3 water	Fish Eggs no./m ³ water
19	24-00	82-23	SE	I-19	1500-1700	IO	37.42	2 •0	• 053	•134	• 000
50	23-17	82-50	SE	I-22	0728-1100	10	50°09	2.0	• 040	•010	•000
21	23-20	83 - 32	SE	I=22	1435-1735	6	61.70	1 . 2	4 19h	•000	•000
22	23-30	84-58	SE	I - 23	0247-0647	2-3	63 . 77	4.0	•063	e078	•000
23	23-30	85-38	SE	I-23	1020-1420	6	58 - 89	2 • 5	• 042	•034	•000
23	23-36	86-40	Ca	I-24	0135-0345	0	45 • 83	6 ° 0	•131	•567	•087
27	26-42	86-00	C	I=25	1 720 - 2120	2	90.17	2 • l4	•027	•055	•000
28	27 - 18	85 - 55	NE	I 26	0025-0430	5	88 . 66	5•0	•056	•034	110.
29	27-54	85-55	NE	I - 26	0940-1315	78	79.40	2 ° 0	•025	•025	•025
30	26-11	86‱25	NC	I = 26	1550-1925	9	80 . 01	2 •5	•031	•137	000•
31	2 8–06	87-05	NC	I-27	2345-0400	9	88-49	12•0	•136	• 057	1 10 °
32	28-00	87-55	NC	I=27	0708-1120	9-10	90 e 58	4 . 2	•046	•132	•022
33	28-09	88-50	NC	I-27	1745-1935	3 <u>m</u> l₁	36 _e 15	t•5	•124	•221	0 83
34	28 <u>-5</u> 1	94-04	NW	I=29	0745=1130	8	101.18	4.02	•042	•208	2 83

TABLE 5 (Continued)

Table 6.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 4-2A.

knots)
4-5
tows:
of
speed
sampler;
(G-111

Sta-	Posi (mid	ition point								P1 ank ton	
tion	N. Lat.	of tow) Sub- N. Lat. W. Long. Area	Suh- Date Area 1952	Date 1952	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (Im)	Volume ml/m3 water	Fish Larvae no./m3 water	Fish Eggs no./m ³ water
21	23-33	84-31	SE	9 I- I	2541-2241	~ ~	271.043	0•4L	•052	1 81	200.
23	24-33	83-04	SE	I=17	1105-1135	10	240•71	34•7	hthro	3.984	1 . 998
26	24-25	82-25	SE	61 - 1	0011-0011	10	187 . 20	35•7	•190	1 •661	•000
27	21-15	82-24	SE	I - 19	לוווב- כווונ	10	181 . 55	55 . 1	•304	1 . 636	•005
28	23-49	82-19	SE	1 -1 9	1920 - 1950	Ţ	276•38	27.2	•098	•586	•003
29	23 - 34	82-21	SE	1 - 19	2320-2350	Ч	256.60	28 . 6	•112	e 203	€00€
32	23-25	83-54	SE	I-22	1 943-2013	Ч	276.60	24 . 0	•087	•127	•000
£	23-31	85-59	Ca	I-23	21/12-21/1	ę	215.45	30 . 4	τητ.	•427	•042
36	23-30	86-42	Ca	I-24	0058-0128	Ч	140°04	47.9	146•	2.056	021
टग	27-36	85 16	NE	I - 26	0855 - 0925	e	277 . 04	28 . 0	• 101	•220	•036

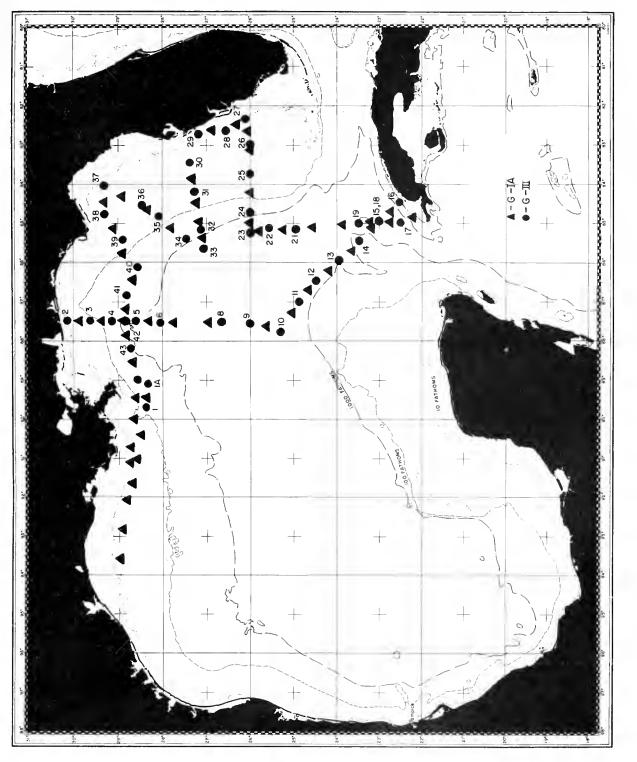


Figure 7.--Location of plankton tows made during Cruise 5-2C, May-June 1952. Numbers identify stations. Table 7.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 5-2C.

(G-IA sampler; speed of tows: 9-10 knots)

	Pos (mid-	Position (mid-point							P1	Plankton	
Tow	of N. Lat.	of tow) t. W. Long.	Sub-	Date 1952	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volume ml/m ³ water	Fish Larvae no./m ³ water	Fish Eggs no./m ³ water
Ч	28-42	01-10	NC	V-21	0625-1025	8	1 38 , 66	3 ° 7	• 027	•1 95	• 007
2	28-35	10-16	NC	V-21	1038-1538	8	105.13	6•li	• 061	•504	•304
Ś	28-29	90-21	NC	V-21	1605-1808	ω	50.10	22 •5	•449	• 858	•279
Ţ	28-22	89-26	NC	V-22	0140-0525	11	81 - 64	2 . 8	+03h	•061	000•
v	29-52	87-29	NC	V-24	0220-0520	Υ	65 • 38	15°0	• 229	•811	•000
9	29-23	87-29	NC	V - 2µ	0641-0921	10	57•29	6.lt	。 112	•733	•017
7	28-53	87-29	NC	V - 24	1220-1503	10	118.15	5.6	\$047	•195	• 000
8	28-20	87-30	NC	V-24	1,800-2100	æ	101.05	6 . 4	•063	•020	•019
6	27-46	87-31	NC	V - 25	0210-0610	8	133.99	1li•9	111.	•530	•030
10	26-58	87-31	NC	V − 25	007T-00TT	12	100°75	2°1	•024	•109	•010
12	25=38	87-39	C	V - 26	0210-0605	7	145.39	4 . 8	•033	•172	•000
13	25~03	87-13	U	V-26	0955 ~1 355	77	139.13	1 . 6	•012	.165	•000
ηι	24-40	86-li2	C	V - 26	1725–2115	77	1,48.16	16•0	•108	•162	•074
IJ	24-12	86-12	C	V-27	0010-0200	Ŋ	155.04	20 . 8	•13h	•310	•032

	Pos.	Position (mid_noint							Р	Plankton	
Tow	of No Lato	of tow) to W. Long.	Sub- Area	Date 1952	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volume ml/m ³ water	Fish Larvae no./m3 water	Fish Eggs no./m3 water
16	14-62	85-42	SE	V-27	0830-1320	12	168 . 24	1 . 2	•007	•065	°006
17	23=11	85 - 08	SE	V-27	1725-2030	13	145°92	l4•0	° 027	44L.	•000
18	22-45	84-42	SE	V-27/28	2315 ~ 0400	м	172.63	1 . 6	•009	•075	tho。
19	22=13	84-48	SE	V - 28	0645=1115	13	161.10	2. lu	• 015	•068	•012
20	22-45	84-57	SE	V-28	1600-1800	13	90 • 50	0 • 5	•006	• 000	000•
21	23 ⊷ 13	84-58	SE	V-28	2037-2330	Ś	102.03	5.6	•055	• 059	690●
22	23-52	85-02	SE	V 29	0210 - 0553	w	131.19	14•0	•030	•053	•030
23	24-35	85-07	SE	V-29	217T- 5080	15	134°43	h.o	°030	•171	•015
24	25 … 15	85-08	SE	V-29	1423-1715	15	104-88	4.2	•040	• 400	•019
25	25-47	85-12	SE	V-29	1920–2155	w	88 。 33	24.05	•291	•249	•130
26	26-00	84-58	SE	V - 30	0120-0430	у	110 • 75	11.2	101.	•190	•099
27	26-00	84-11	SE	Δ - 30	0718-1220	13	181.2 8	5 ° 6	•031	•199	•20µ
28	26-00	83-08	SE	Δ = 30	1635-1730	18	26°67	11.2	•420	1 0 087	1.012
29	26-04	82~38	SE	V=30	1835-2250	8	108.30	16.0	°148	1.05 42	•139
30	26-18	82-28	SE	V - 30/31	2300-0135	S	119 °2 6	8 • O	•067	•268	2°140

TABLE 7 (Continued)

TABLE 7 (Continued)

	Post	Position							đ	Plankton	
Tow	Jo Jo	tow		Date	Time	Depth of	Volume water	Volume	Volume	Fish Larvae	Fish Eggs
	N. Lat.	W. Long.	Area	1952	(CoSoTo)	tow (m.)	strained in m	(TW)	JAN PA CH/TH	NO./M/ WALL	IOO WA WI OU
31	2653	82 - 36	SE	. τε- Δ	0250-0605	e	98 . 71	llol	•146	1 •996	。 263
32	27-20	83 - J .0	NE	L-IV	05 02 =0855	12	149 0 93	25 •6	•171	1 •000	م147°,
33	27 -1 4	84 28	NE	I ⊷I∧	1015-1300	Ъ	83•07	4.0	• Old 8	•313	•036
34	27-10	84 -5 6	NE	I-IV	1315-1535	15	87.18	2•l4	•028	.161	•000
35	27-06	85-21	NE	VI-1	1800-2020	17	84.15	4 •8	•057	•261	•000
37	27-48	85-06	NE	VI - 2	0080-0110	м	150.27	9 ° 6	•064	•213	• 293
38	28-20	84-40	NE	VI-2	0925 - 12 1 0	13	93 . 56	20 . 8	•222	oلtا3•	•620
39	28-54	84-16	NE	VI-2	15 30-2 040	IO	158 - 50	17.6	111.	•719	•271
ho l	29 - 19	84-25	NE	VI~2/3	2225 - 02 1 5	м	129 ° 02	25.6	• 198	1. 310	1. 139
며	29-06	85 =06	NE	Ε- ΙΛ	0310-0635	7	94•7LL	12 •8	•109	a 128	2.017
दम	28 -5 3	85 - 46	NE	VI-3	0816-1153	20	143 . 98	ϯ●ϯͳ	•100	LLL。	110°
L 13	28-40	86-26	NC	Δ1- 3	1320-1605	20	95 ° 58	1°0	•042	• 084	•000
11	28 - µ9	87-12	NC	VI-3	1850-2200	12	115 . 98	6•4	• 05 5	•207	•017
115	28-47	87-51	NC	τ⊨ΙΛ	0105-0500	12	123°44	19°2	•156	•251	• 000
1 46	28-40	88 - 31	NC	η-IV	0730-1145	12	156.63	2°1	o15°.	°115	• 000

TABLE 7 (Continued)

Table 8.---Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 5-2C.

(G-III sampler; speed of tows: 4-5 knots)

Postition Fostition Sub- Bate (sart) Depth of trained in m^2 Volume water, (n,1) Volume Volume First interval First interv					30	30-minute tows	48				Plankton	
28-24 $89-42$ Vc -220 $260-40$ $280-16$ Vc -220 -220 -310 -326 $12-20$ $87-20$ Nc $V-22$ 6545 $200-40$ $319,76$ 34.1 -097 -326 $30-06$ $87-29$ Nc $V-24$ 0144 5 181.944 46.0 -253 1.205 $29-10$ $87-29$ Nc $V-244$ 1136 $200-40$ $219,637$ 4.93 1.205 $29-10$ $87-29$ Nc $V-24$ 1136 $200-40$ $219,637$ $219,63$ 4.11 $28-11$ $87-26$ Nc $V-25$ 1700 $219,637$ $219,63$ 4.11 $28-10$ $87-16$ $V-25$ 1720 $200-40$ $210,637$ $210,63$ $210,63$ $26-10$ $87-16$ V V V $200-40$ $210,657$ $210,6$ 1100 1100 $26-10$ $87-16$ </th <th>Sta- tion</th> <th>N• I</th> <th>ltion W. Long.</th> <th>Sub-</th> <th></th> <th>(start) ($C_{\circ}S_{\circ}T_{\circ}$)</th> <th>Depth of tow (m.)</th> <th>Volume water strained in m³</th> <th>Volume (ml)</th> <th>Volume ml/m³ water</th> <th>Fish Larvae no./m3 water</th> <th>Fish Eggs no•/m³ water</th>	Sta- tion	N• I	ltion W. Long.	Sub-		(start) ($C_{\circ}S_{\circ}T_{\circ}$)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volume ml/m ³ water	Fish Larvae no./m3 water	Fish Eggs no•/m ³ water
1 28-20 89-06 NC V-22 0545 200-90 34.0 6.07 336 30-08 67-30 NC V-21 0114 5 181.91 16.0 .253 1.215 29-38 87-30 NC V-21 0114 5 181.91 16.0 .253 1.215 29-10 87-29 NC V-21 1.356 200-90 277.65 31.1 .123 1.4900 28-31 87-29 NC V-21 1720 200-90 277.65 31.1 .123 .1417 28-31 87-29 NC V-25 1720 200-90 219.03 21.00 .123 .1417 28-01 87-32 NC V-25 1720 200-90 216.0 .123 .120 .120 26-10 87-32 C V-25 177.65 31.4 .120 .120 .120 26-10 87-32 C V-25 170 206.2	ч	28-24	89-42	NC	V-21	2205	200	289 . 18	1,6,1	a 159	1.311	•785
30-06 87-30 NG V=2ll 01ll 5 181.9ll 16.0 553 1.215 29-36 87-29 NG V=2ll 0600 15 196.25 96.7 1493 1.900 29-10 87-29 NG V=2ll 0600 15 196.25 96.7 1493 1.900 29-10 87-29 NG V=2ll 1720 200-40 277.66 3lu.1 1.23 0.4lrl 28-31 87-32 NG V=2l 1720 200-40 219.03 2lu.0 1.10 1.20 0.101 28-01 87-32 NG V=2l 1720 200-40 219.03 2lu.0 0.129 0.101 0.102 26-40 87-32 C V=2l 0130 100-40 280.79 31.4l 556 280 26-40 87-32 C V=2l 0130 100-40 280.79 21.4l 556 26-40 67 10	A	28-20	89-06	NC	V-22	05,45	200	349•76	34.1	•097	•32 6	•066
29-36 87-27 NG V-24 0600 15 196.25 96.7	2	30-08	87-30	NC	V-24	गगरा	у	1 81 。 94	146 . 0	•253	1 . 215	7.002
29-10 87-29 NC V-21 1136 200-40 277.66 34.1 -123 -147 28-37 87-29 NC V-24 1720 200-40 219.03 214.0 -123 -110 28-04 87-32 NC V-25 0135 100-40 209.85 31.4 -129 -110 26-00 87-32 C V-26 0130 100-40 286.22 25.6 -089 -280 26-00 87-32 C V-26 0130 100-40 280.79 31.4 -129 -129 26-00 87-32 C V-26 0130 100-40 280.79 -114 -556 26-10 87-36 0130 100-40 280.79 28.40 -114 -556 26-10 87-36 0130 100-40 280.79 28.40 -114 -556 26-10 87-30 10 100 20.40 28.40 28.40 28.40 28.40<	m	29-38	87-29	NC	V-24	0600	15	196 . 25	96•7	•493	1.900	•825
28-37 87-29 NC V-24 1720 200-40 219.03 214.0 410 410 28-04 87-32 NC V-25 0135 100-40 209.85 31.44 150 129 26-00 87-32 C V-25 1720 200-40 286.82 25.46 609 6129 26-00 87-32 C V-26 0130 100-40 286.82 25.46 609 6280 26-00 87-32 C V-26 0130 100-40 286.77 25.46 609 6280 25-16 87-16 C V-26 0820 200-40 216.57 25.41 676 676 216-53 87-16 C V-27 0820 200-40 214.91 6513 216-53 85-54 28 V-27 200 106.42 20.46 676 676 216-53 85-54 58 V-27 200-40 210.40 210.4	ħ	29-1 0	87-29	NC	V-24	11 36	200-00	277.66	34.1	•123	۰14 ¹	•025
28-01 87-32 NC V-25 0135 1000 209.655 31.01 150 .129 26-00 87-32 C V-25 1720 2000 286.22 25.66 .089 .280 26-00 87-32 C V-26 0130 1000 280.79 32.00 .114 .556 26-00 87-36 C V-26 0820 2000 280.79 32.00 .114 .556 25-15 87-46 C V-26 0820 2000 215.67 26.11 .103 .556 21-53 87-46 C V-26 1645 2000 215.67 .103 .269 .269 21-53 86-28 C V-26 1645 2000 216.47 .103 .269 21-58 86-28 C V-27 0005 1000 20.46 .103 .313 21-58 85-57 S8 V-27 075 .076 </td <td>ъ</td> <td>28-37</td> <td>87-29</td> <td>NC</td> <td>V-24</td> <td>1720</td> <td>2000</td> <td>219-03</td> <td>24.0</td> <td>011.</td> <td>011.</td> <td>•000</td>	ъ	28-37	87-29	NC	V-24	1720	2000	219-03	24 . 0	011.	011.	•000
26-40 87-32 C V-25 1720 200 286.22 25.6.6 .089 .280 26-600 87-32 C V-26 0130 100 280.79 32.0 .114 .556 25-13 87-46 C V-26 0820 200 280.79 32.0 .114 .556 25-13 87-40 C V-26 0820 200 280.79 32.0 .114 .556 214-53 87-40 C V-26 1645 200 221.0 20.6 .004 .511 214-53 86-28 C V-27 0005 100 20.6 .014 .511 214-28 86-28 C V-27 0005 100	9	28-oli	87-32	NC	V - 25	0135	1000	209.85	31.04	•150	•129	• 009
26-00 87-32 C V=26 0130 10000 280.79 32.0 114 556 25-19 87-46 C V=26 0820 20000 245.57 25.41 103 656 244-53 87-00 C V-26 1645 20000 245.67 25.64 .103 .269 214-53 87-00 C V-26 1645 20000 221.19 20.68 .094 .511 214-53 86-28 C V-27 0005 10090 204.42 31.64 .533 214-28 86-28 C V-27 0005 10090 204.42 31.64 .333 23-51 85-57 58 V-27 075 203.60 .075 .116 23-51 85-26 S8 V-27 1545 200-90 .075 .116 23-50 84-57 S8 V-27 2740 156.00 .075 .126 23-50	æ	26-40	87 - 32	сı	ν - 25	1720	200	286 ° 22	25.6	•089	•280	•028
25-19 87-46 v-26 0820 200-40 245,67 25,64 103 269 21,453 87-00 c v-26 1645 200-40 221,619 20,6 004 511 21,-28 86-28 c v-27 0005 100-40 201,642 31,64 151 533 21,-28 86-28 c v-27 0005 100-40 201,642 31,64 651 533 23-57 85-57 58 v-27 0755 200-40 213,67 16,00 675 313,6 23-28 85-26 58 v-27 0755 200-40 712,60 712 313 23-20 84-57 58 v-27 1545 200-40 712 075 146 23-20 84-57 58 v-27 1545 201,90 712 075 146 23-00 84-57 58 V-27 1540 12,89 076 216 <	6	26-00	87 - 32	U	V-26	0730	1000	280.79	32•0	4LL.	•556	•007
21,-53 87-00 C V-26 1645 20000 221,019 20,6 6094 6511 21,-28 86-28 C V-27 0005 10090 204,042 31,04 154 333 23-57 85-57 58 V-27 0755 20090 213,07 16,00 .075 .333 23-58 85-26 58 V-27 1545 20090 213,07 16,00 .075 .146 23-28 85-26 58 V-27 1545 20090 201,90 7.2 .036 .146 23-00 84-57 58 V-27 1545 20090 216,90 7.2 .036 .216 23-00 84-57 58 V-27 1545 20090 216,90 7.2 .036 .216	o,	25 ⊷1 9	87-46	U	V-26	0820	2000	245.57	25 . li	•103	•269	•033
21,-28 86-28 C V-27 0005 100>0 204,42 31,4 154 .333 23-57 85-57 58 V-27 0755 200>0 213,67 16,0 .075 .146 23-28 85-26 58 V-27 1545 200>0 201,90 7,2 .036 .146 23-00 84-57 58 V-27 1545 200>0 201,90 7,2 .036 .218 23-00 84-57 58 V-27 2240 100>0 218,98 12,8 .058 .173	Ч	24-53	87-00	υ	V-26	1 645	2000	221 .1 9	20. 8	•09lt	•511	•059
23-57 85-57 SB V-27 0755 200>0 213.07 16.0 .075 .116 23-28 85-26 SE V-27 1545 200>0 201.90 7.2 .036 .218 23-00 84-57 SE V-27 1546 100>0 218.98 12.8 .058 .173	2	24 - -28	86-28	U	V-27	6000	100001	204.e42	3 1. 4	•154	•333	•025
23-28 85-26 SE V-27 1545 200-→0 201,90 7,2 ,036 ,218 23-00 84-57 SE V-27 2240 100-→0 218,98 12,8 ,058 ,173	ς.	23457	85-57	SS	V-27	0755	2000	213 ° C7	16.0	•075	•146	•009
23-c0 84-57 SE V-27 2240 100-→0 218,98 12.8 058 0173	7	23-28	85 - 26	SE	V-27	1545	200	201 . 90	7•2	•036	21 8	•025
	Ń	23-00	84-57	SE	V-27	22h0	1000	2 1 8 . 98	12. 8	• 05 8	•173	,llo.

Tentility Static field Static field Tentility Fight of static field Volume vature vature Volume vature vature Value vature					30	30-minute tows	18				Plankton	
22-33 $81-26$ $x-26$ 6600 $200-90$ $269,32$ $16,1$ 6060 $200-90$ $269,32$ $16,1$ 6060 $220,32$ $22-32$ $81-57$ 58 $v-28$ 1525 $200-90$ $269,32$ $16,1$ 6060 2202 $23-00$ $81-57$ 58 $v-29$ 1315 $200-90$ $275,606$ $15,65$ 6056 2222 $21-56$ $85-07$ 58 $v-29$ 1315 $200-90$ $290,956$ $415,33$ 1033 0015 $100-90$ $290,956$ $415,33$ 1256 203 $25-01$ $85-07$ 58 $v-30$ $100-90$ $351,413$ $36,41$ 1014 231 $26-00$ $81-414$ 58 $v-30$ $353,420$ $495,43$ $416,93$ 4596 2203 $26-00$ $81-414$ 58 $v-30$ $353,420$ $495,4$ 4104 2313 $26-00$ $813-416$ $116,6,7$	ta-	I	ition		Date 1952	TIME (stert) (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volu Malu	Fish Larvae no./m ³ water	Fish Eggs noo/m ³ water
22-32 $81+57$ $5E$ $V-28$ 1525 $200-90$ $265-32$ 16.61 0060 260 2300 $81-57$ $5E$ $V-28$ 2000 $100-90$ $275,665$ $15,55$ 0056 -222 2330 $81-50$ $5E$ $V-29$ 1315 $200-90$ $275,665$ 1164 012 012 $25-31$ $85-09$ $5E$ $V-29$ 1315 $200-90$ $290,957$ 1164 012 012 $25-31$ $85-07$ $5E$ $V-29$ 1315 $200-90$ $251,413$ $36,44$ -102 -203 $26-00$ $85-113$ $5E$ $V-30$ 1310 $75-90$ $351,413$ $36,44$ -203 -203 $26-00$ $85-113$ $5E$ $V-30$ 1310 $75-90$ $56,95$ -206 -203 $26-00$ $85-113$ $5E,91$ $16,913$ $36,41$ $216,91$ -223 -203	16	22-33	87.	1	V-28	0600	200->0	243 . 27	8 . 3	•C34	•243	•288
23-00 84 $+5$ 7 58 $v-28$ 2000 100- -0 0 275 $+0$ 6 15.5 0.056 -222 23-30 85 -00 58 $v-29$ 0135 100- -0 0 290 $+95$ 14 $+4$ 0.09 -193 -222 21 $+56$ 85 -07 58 $v-29$ 1315 200- -90 290 $+95$ $156 + 3$ -156 -203 25 -314 85 -07 58 $v-30$ 2015 100- -90 216 $+31$ $-36 + 5$ -203 -203 26 -00 81 -141 58 $v-30$ 0645 $250 - 90$ $353 + 5$ -104 -231 26 -00 81 -141 58 $v-30$ 1330 $75 - 90$ $356 + 5$ -104 -232 26 -00 81 -141 58 $v-30$ 1330 $75 - 90$ -1014 -235 26 -00 81 -141 58 $v-30$ $156 + 1$ -266 -260 -252 26 -00 81 -20 82 $-$	~	22-32	84-57	SE	V ⊷28	1525	200	269 . 32	1601	•060	•260	£00•
23-30 $85-00$ SE $v-29$ 0135 10000 290.95 14.64 019 -193 $21-56$ $85-09$ SE $v-29$ 1315 20090 290.955 145.3 -156 -203 $25-31$ $85-07$ SE $v-29$ 1815 10090 216.31 36.5 -169 -596 $26-00$ $85-15$ SE $v-30$ 0045 10090 216.31 36.5 -169 -596 $26-00$ $85-15$ SE $v-30$ 0045 10090 351.413 36.6 -101 -231 $26-00$ $81-141$ SE $v-30$ 1330 $75-90$ 380.13 36.6 -101 -231 $26-00$ $83-12$ SE $v-30$ 1300 157.77 1660 -211 -295 $26-00$ $83-16$ $82-30$ $161-4$ $251-6$ -203 -201 -205 <td< td=""><td>ഹ</td><td>23-00</td><td>84-57</td><td>SE</td><td>V-28</td><td>2000</td><td>100−→0</td><td>275.06</td><td>15 of</td><td>•056</td><td>•222</td><td>410°</td></td<>	ഹ	23-00	84-57	SE	V-28	2000	1 00 −→ 0	275.06	15 of	•056	•222	410°
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	<u>م</u>	23-30	85 - 00	SE	V - 29	0135	1000	2 90•95	ग्¶¶त	•049	•193	•010
25-3L $85-07$ SE $v-29$ 18 L/5 1000 $216-3$ L $36-5$ -169 6596 $26-00$ $81-1$ L SE $v-30$ 00 L/5 1000 $351-13$ $36-5$ -169 6596 $26-00$ $81-14$ L SE $v-30$ 00 L/5 25090 $353-20$ $49-9$ -104 L -231 $26-00$ $83-13$ SE $v-30$ 1330 7590 $360-13$ $32-0$ -104 L -232 $26-07$ $83-00$ SE $v-30$ 1800 30 $167-77$ $166-0$ -214 -295 $26-07$ $82-36$ SE $v-31$ 0215 10 $151-33$ $22-4$ $-116-33$ -270 -295 $26-07$ $82-36$ SE $v-31$ 0215 10 $156-3$ -295 -569 $27-17$ $82-16$ SE 100 100 100 100 $-255-70$ -201 </td <td></td> <td>24-56</td> <td>85-09</td> <td>SE</td> <td>V29</td> <td>1345</td> <td>200</td> <td>290.95</td> <td>45.03</td> <td>•156</td> <td>•203</td> <td>100°</td>		24-56	85-09	SE	V 29	1345	200	290 . 95	45.03	•156	•203	100°
26-00 $85-15$ SE $V-30$ 0045 1000 $351-43$ $36-4$ -104 -231 $26-00$ $81-444$ SE $V-30$ 0645 2500 $353-20$ $49-9$ -1141 -252 $26-00$ $83-443$ SE $V-30$ 1330 7590 $380-13$ $32-0$ -0844 -252 $26-01$ $83-00$ SE $V-30$ 1330 7590 $380-13$ $32-0$ -0844 -295 $26-07$ $83-00$ SE $V-30$ 1330 7590 $380-13$ $22-64$ -146 -294 -295 $26-07$ $82-36$ SE $V-30$ 2225 10 $167-77$ $166-0$ -145 -569 $26-31$ $82-36$ SE $V-31$ 0215 10 $156-0$ -145 -569 $26-31$ $82-36$ $SE -46$ $SE -46$ $180-46$ $14-5$ -1612 -569	N	25 = 34	85-07	SE	V - 29	1 845	0 00T	216 - 34	36•5	a 169	•596	410 .
$26-00$ $8\mu-\mu$ $5E$ $v-30$ 0645 $250-0$ $353\cdot20$ $49\cdot9$ $\bullet1h1$ $\bullet252$ $26-00$ $83-\mu_3$ $5E$ $v-30$ 1330 $75-0$ $380\circ13$ $32\circ0$ $\circ08h$ $\bullet295$ $26-00$ $83-00$ $5E$ $v-30$ 1800 30 $167\circ77$ $46\circ0$ $\circ27h$ $\bullet295$ $26-07$ $82-20$ $5E$ $v-30$ 1800 30 $167\circ77$ $46\circ0$ e^{27h} e^{230} $26-07$ $82-20$ $5E$ $v-31$ 0215 10 $154\circ33$ $22\circ h$ e^{145} e^{530} $26-07$ $82-36$ $5E$ $v-31$ 0215 10 $181\circ h$ e^{120} e^{145} e^{569} $27-12$ $82-4i$ NE v_{1-1} 0425 5 $156\circ11$ $63\circ2$ e^{123} e^{145} e^{569} $27-12$ $83-26$ NE v_{1-1} 0425 5 $256\circ78$ $11-6$ $1-31\circ6$ $1-35\circ2$ $1-31\circ6$ $1-31\circ6$ $21-40$	<u>م</u>	26-00	85 - 15	SE	V=30	0045	100-+0	351•li3	36.4	•10h	•231	•151
$26-00$ $83-4i3$ $5E$ $v-30$ 1330 $75-40$ $380,413$ $32,00$ $.084$ $.295$ $26-00$ $83-00$ $5E$ $v-30$ 1800 30 $167,77$ $166,00$ $.274$ $.295$ $26-07$ $82-20$ $5E$ $v-30$ 2805 10 $167,77$ $166,00$ $.274$ $.6530$ $26-07$ $82-20$ $5E$ $v-31$ 0215 10 $181,646$ $31,65$ $.145$ $.569$ $26-314$ $82-36$ $5E$ $v-31$ 0215 10 $181,646$ $.145$ $.569$ $.569$ $27-12$ $82-4i3$ NE $v-31$ 0645 5 10 $181,646$ $.145$ $.569$ $.569$ $.567$ $.120$ $.131,64$ $.916$ $.913$ $.916$ $.916$ $.2740$ $27-17$ $81,-11$ NE v_{1-1} 0940 $.10$ $.206$ $.103$ $.216$ $.206$ $.210$ $.203$ $.210$ $.203$ $.210$ $.203$ $.208$ <td>4</td> <td>26-00</td> <td>84-44</td> <td>SE</td> <td>V-30</td> <td>0645</td> <td>250</td> <td>353°20</td> <td>49•9</td> <td>LµL.</td> <td>°252</td> <td>•006</td>	4	26-00	84-44	SE	V-30	0645	250	353 ° 20	49 • 9	LµL.	° 252	•006
$26-00$ $83-00$ SE $v-30$ 1800 30 $167-77$ $ll6_0$ $a27h$ 0530 $26-07$ $82-20$ SE $v-30$ 2225 10 $15l_{0}33$ $22ah$ $1L5$ 059 $26-3h$ $82-36$ SE $v-31$ 0215 10 $15l_{0}63$ 2145 0150 056 $26-3h$ $82-36$ SE $v-31$ 0215 10 $181abb$ 0145 0569 0569 $1-350$ 556 $27-12$ $82-443$ NE $v-31$ 0645 5 $150ab$ $1abb$ $0bb$ $1a350$ 5^{5} $27-2h$ $83-26$ NE v_{1-1} 0425 25 $265ab$ $1bb$ $0bb$	Ś	26-00	83-43	SE	V-30	1330	75	380.13	32.0	•08l4	•295	•200
26-07 82-20 SE V-30 2225 10 154.e33 22.e4 .145 •569 26-31 82-36 SE V=31 0215 10 181.e46 34.e5 •190 1.e350 5 27-12 82-43 NE V=31 0645 5 150.e11 63.e2 eh21 •966 1 27-21, 83-26 NE VI=1 0425 25 255.78 31.e4 e118 •966 1 27-21, 84.m11 NE VI=1 0425 25 255.81 45.e3 e118 •384 27-17 84.m11 NE VI=1 094.0 10 295.81 45.e3 e123 e240 27-08 85-07 NE VI=1 1720 200	,	26-00	83-00	SE	V-30	1800	30	167°77	146°0	•274	•530	•524
2634 8236 SE V31 0215 10 181-646 34-5 -190 1-350 5 2712 8243 NE V31 0545 5 150-11 63-2 -421 -966 1 2724 8326 NE VI1 0425 25 265-78 31-6 -118 -966 1 2721 8411 NE VI1 0425 25 265-78 31-6 -118 -384 -384 27-08 85-07 NE VI1 0940 10 295-81 45-3 -153 -240 27-08 85-07 NE VI1 1720 200>0 379-69 31-6 -033 -208	~	26-07	82-20	SE	V-30	2225	JO	154°33	22.h	• 145	•569	•265
27-12 82-43 NE V-31 0645 5 150e11 63e2 4l21 966 1 27-24 83-26 NE VI=1 0425 25 265e78 31e4 118 984 27-17 84=11 NE VI=1 0940 10 295e81 45e3 e153 e240 27-08 85=07 NE VI=1 1720 200>0 379e69 31e4 e083 e208	0	26=34	82-36	SE	V⊷31	0215	10	181°46	34.5	•190	1ø350	5 • 632
27-24 83-26 NE VI=1 0425 25 265.78 31.64 0.18 .384 27-17 84.41 NE VI=1 094.0 1.0 295.81 45.63 .153 .240 27-08 85-07 NE VI=1 1720 200>0 379.69 31.64 .083 .208	5	27-12	82-43	NE	V-31	0645	ъ	150.11	63 . 2	•li21	•966	1°093
27-17 84-11 NE VI-1 0940 10 295-81 45-3 153 -240 27-08 85-07 NE VI-1 1720 200-90 379-69 31-4 083 -208	0	27-24	83=26	NE	T⇔IΛ	0425	25	265°78	31•l	e118	•384	•192
27-08 85-07 NE VI-1 1720 200	L L	27-17	84~11	NE	T-IV	0940	10	295 • 81	15°3	•153	•240	°105
	2	27-08	85-07	EN	T-IV	1720	200->0	379 _° 69	31°4	•083	•208	°008

TABLE 8 (Continued)

()Depth of tow (m.)Volume waterVolume \sqrt{nlume} Volume \sqrt{nlume} Volume \sqrt{nlume} $50 - \sqrt{n}$ 311.26 10.41 130 $50 - \sqrt{n}$ 311.26 10.41 130 $75 - \sqrt{n}$ 362.03 16.61 127 $75 - \sqrt{n}$ 211.92 17.66 083 $10 - \sqrt{n}$ 255.63 19.61 192 15 251.666 16.61 013 15 251.666 16.61 012 15 271.666 16.60 013 $100 - \sqrt{n}$ 325.83 22.8 070 $100 - \sqrt{n}$ 325.83 22.61 012 $100 - \sqrt{n}$ 373.95 19.2 051 $100 - \sqrt{n}$ 328.92 19.2 051 $100 - \sqrt{n}$ 313.33 16.0 016 $200 - \sqrt{n}$ 313.46 19.2 061					Э	30-minute tows Time	13				D1 ankton	
Z7-65 85-440 NB VI-1 Z317 50 311.26 10.01 130 167 Z7-28 8523 NB VI-2 0330 500 362.03 166.0 127 356 28-07 81-50 NB VI-2 0850 750 255.63 146.0 127 356 28-30 81-50 NB VI-2 1450 10> 255.63 17.6 923 215 1909 28-30 81-02 NB VI-3 2150 15 203.09 36.3 176 180 176 29-19 81-02 NB VI-3 2150 15 203.09 36.3 176 190 2163 17.780 29-19 81-02 NB VI-3 225.03 22.6.03 179 179 2130 176 28-51 85-52 NB VI-3 200	Sta. tior	N. T	- 11	Sub-		(start) (CoSoTo)	Depth of tow (m.)	Volume water strained in m3	Volume (ml)	ume water	Fish Larvae no./m3 water	
27-28 $65-23$ NE $VI-2$ 0330 $50-90$ 362.03 $L6.6$ $.127$ $.356$ $28-07$ $81-50$ NE $VI-2$ 0850 $75-90$ 211.922 17.6 $.033$ $.245$ $28-30$ $81-50$ NE $VI-2$ 1450 $L0-90$ $.255.63$ $L9.1$ $.1922$ 1.909 $29-19$ $81-56$ NE $VI-2$ 2150 15 251.66 $L9.1$ $.1922$ 1.909 $29-19$ $81-46$ NE $VI-3$ 0237 203.09 36.3 $.179$ $.2453$ 1.900 $29-19$ $81-46$ NE $VI-3$ 070 236.83 26.3 $.1792$ $.1790$ $28-51$ $85-66$ NE $VI-3$ $1200-90$ 236.83 22.46 $.070$ $.2452$ 1 $28-51$ $85-65$ NE $VI-3$ $1200-90$ 236.62 22.4 $.070$ $.2452$	33	27-05	85-40	NE	U ∎1	2317	2005	311.26	40.ł	•130	•li67	•029
28-07 84-50 NF VT-2 0850 7560 211.92 17.66 .083 .245 28-10 84-12 NE VT-2 1450 4070 255.63 49.1 -192 1.909 29-19 84-02 NE VT-2 2150 15 251.66 46.0 .183 1.7.787 29-19 84-046 NE VT-3 0737 10090 257.66 46.0 .183 17.7787 29-19 84-046 NE VT-3 0737 10090 325.613 36.3 .179 2.4132 1 28-51 85-55 NE VT-3 0737 10090 325.613 .179 .2.132 1 28-51 86-51 NC VT-3 1245 10090 373.955 19.2 .071 .1918 28-51 86-51 NC VT-3 1815 10090 .373.955 19.2 .071 .198 28-54 86-51	34	27-28	85 - 23	NE	VI-2	0330	50 ₩0	362 . 03	146 • 0	.127	•356	•008
28-30 84-32 NE VI-2 1450 4050 255.65 49.1 .192 1.909 29-19 84-02 NE VI-2 2150 15 251.66 46.0 .183 17.787 29-19 84-46 NE VI-3 0235 20 203.09 36.3 .179 2.4132 1 29-19 84-46 NE VI-3 0737 203 20 203.09 36.3 .179 2.4132 1 28-51 85-55 NE VI-3 1245 1000 325.83 22.6 .070 .295 2.413 28-40 86-51 NC VI-3 1245 1000 373.95 19.2 .071 .198 28-40 86-51 NC VI-3 1815 1000 373.95 19.2 .051 .198 28-50 87-30 NC VI-4 0030 1000 328.92 19.2 .051 .198 28-41 86-51 NC VI-4 0030 1000 333.33 16.0	35	28-07	84-50	NE	VI-2	0850	750	211 . 92	17 . 6	•083	•245	。 193
29-19 84-02 NE VI-2 2150 15 251.66 46.0 .183 17.787 29-19 84-44 NE VI-3 0235 20 203.09 36.3 .179 2.4132 1 28-54 85-25 NE VI-3 0737 1000 325.83 22.68 .070 .2953 1 28-53 86-06 NC VI-3 1245 1000 325.83 22.64 .070 .2953 1 28-50 86-05 NC VI-3 1245 1000 373.95 19.2 .071 .694 28-40 86-51 NC VI-4 0030 1000 373.95 19.2 .051 .198 28-41 88-12 NC VI-4 0030 1000 328.92 19.2 .058 .760 28-43 88-12 NC VI-4 0030 1000 333.33 16.0 .068 .760 28-35	36	28-30	84-32	NE	VI-2	1450	l₄0→0	255.63	49 . 1	•192	1 •909	•509
29-19 84-46 NE VI-3 0235 20 203-09 36.3 .179 2.6432 1 28-54 85-25 NE VI-3 0737 1000 325.63 22.6 0.70 .295 28-51 85-06 NC VI-3 1245 1000 325.63 22.6 .070 .295 28-33 86-06 NC VI-3 1245 1000 373.95 22.6 .071 .694 28-10 86-51 NC VI-3 1815 1000 373.95 19.2 .051 .198 28-50 87-30 NC VI-4 0030 1000 373.95 19.2 .051 .198 28-54 88-12 NC VI-4 0030 1000 313.33 16.0 .048 .106 28-55 89-00 NC VI-4 0650 2000 313.46 19.2 .051 .106 28-54 89-00 NC	37	29 - 19	84-02	NE	VI-2	21 50	15	251 . 66	146°C	. 183	17 . 787	•787
28→54 85→25 NE V1→3 0737 100→0 325,633 22,6 ,070 ,295 28→33 86→06 NC V1→3 1245 100→0 184,455 22,4 ,121 ,694 28→18 86→51 NC V1→3 1815 100→0 373,955 19,2 ,051 ,198 28→50 87→30 NC V1→4 0030 100→0 373,955 19,2 ,051 ,198 28→50 87→30 NC V1→4 0030 100→0 328,92 19,2 ,058 ,760 28→14 88→12 NC V1→4 0650 200→0 333,33 16,0 ,048 ,100 28→14 88+12 NC V1→4 0650 200→0 333,33 16,0 ,048 ,100 28→35 89→00 NC V1→4 1300 200→0 313,46 19,2 ,051 ,100	38	29–19	84-46	NE	£⊷1v	0235	20	203 . 09	36•3	•179	2°432	1 •659
28-33 86-06 NC VI-3 1245 100→0 184.55 22.41 .121 .694 28-40 86-51 NC VI-3 1815 100→0 373.95 19.2 .051 .198 28-50 87-30 NC VI-4 0030 100→0 328.92 19.2 .058 .760 28-51 NC VI-4 0030 100→0 328.92 19.2 .058 .760 28-414 88-12 NC VI-4 0650 200→0 333.33 16.0 .048 .760 28-35 89-00 NC VI-4 0650 200→0 313.46 19.2 .048 .100	39	28-54	85 - 25	NE	VI+3	7570	100001	325.63	22 . 8	•070	•295	.110
28-448 86-51 Nc VI-3 1815 100	140	28-33	86-06	NC	€ - IV	1245	100-+0	184.55	22. li	121	• 694	•043
28-50 87-30 NC VI-4 0030 100-50 328.92 19.2 .058 .760 28-44 88-12 NC VI-4 0650 200-50 333.33 16.0 .048 .100 28-35 89-00 NC VI-4 1300 200-50 313.46 19.2 .048 .100	더	28-48	86-51	NC	VI-3	1 815	100001	373•95	19 ° 2	•051	•198	• 005
28–jii 88–12 NC VI-li 0650 200–90 333.33 16.0 .04.8 .100 28–35 89–00 NC VI-li 1300 200–90 313.46 19.2 .061 .175	77	28 -5 0	87-30	NC	ų-ТV	0030	100	328.92	19.2	• 058	•760	•024
28-35 89-00 NC VI-4 1300 200-40 313-46 19-2 .061 .175	L13	28-14	88-12	NC	η-ιν	0650	200-00	333•33	16.0	• O48	•100	• 006
	1717	28-35	89-00	NC	νIμί	1300	200002	313.46	19•2	•061	•175	•006

TABLE 8 (Continued)



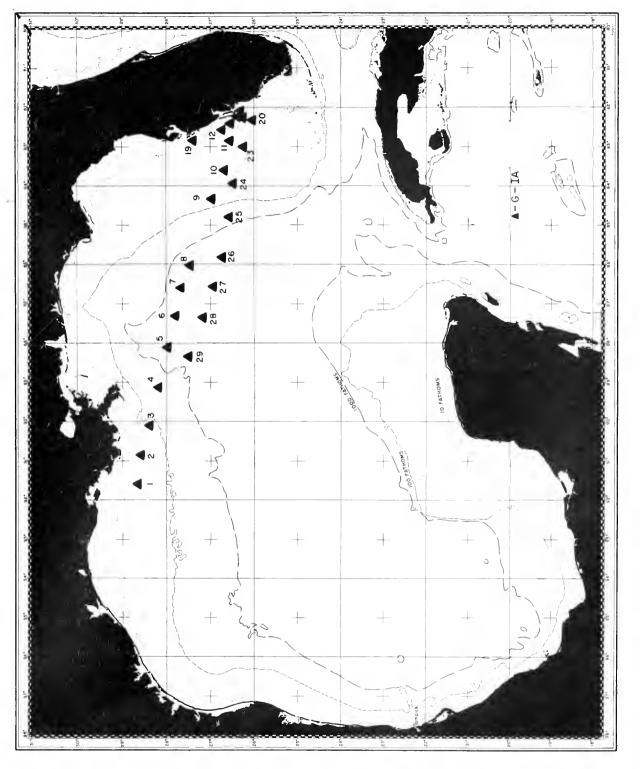


Table 9,---Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 7 (Special).

(G-IA sampler; speed of tows: 9-10 knots)

	Post	Position							1	Plankton	
Tow	of N- Late	(mid-point of tow) Lat. W. Long.	Sub- Area	Date 1952	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volume ml/m3 water	Fish Larvae no./m ³ water	Fish Eggs no./m3 water
-	28-40	91-35	NC		7111-7101	15	118•50	26	•219	• 945	•270
~	28-36	90 ~ 52	NC	XI-14	1435-1835	15	118.57	19	•160	• 953	•759
m	28 - 22	90-06	NC	X I-14	1850-2315	8-10	131 . 34	10	•076	•348	.182
t	28 - 11	89-13	NC	XI=15	23300550	7	148 . 85	11	•074	•080	•006
ъ	27-58	88-06	NC	XI=15	0615 -1 115	15	09•1411	11	•076	•034	• 006
9	27-49	87-18	NC	XI-IX	1122-1622	15	146.08	10	• 068	•068	• 000
7	27-40	86-37	NC	XI -1 5	XI-15 1635-2035	10	121.38	ηr	•115	• 04J	• 000
8	27-28	86-01	NC	XI ~1 5/J6 204	2048-0048	9	122•65	7	• 057	•008	• 000
6	26-58	84-20	SE	XI-16 062	0620-1040	15	137•35	6	• 044	•116	•058
10	26-42	83 - 36	SE	XI-16 105	1052-1452	15	120•30	9	• 050	•091	•091
11	26-35	82-52	SE	XI-16	XI-16 1505-1905	15	118-25	21	a 178	•084	•025
12	26-34	82-25	SE	161 91 - 1X	1915-2115	8	59•39	24	• holt	•067	•084
*13	26-25	82 -1 5	SE	XI-16/17	XI-16/17 2125-0217	9	75.97	26	•342	• 05 2	000
1	26-20	82-05	SE	XI-IX	XI-17 0230-0628	Ŷ	89•53	80	•089	TLU	•000
Ч	off Sani	off Sanibel Island	SE	XI-17	0496-9630 TI-IX	6	95.79	σ	•031	010*	•020

nued	
(Conti	
6	
DABLE	
	g 9 (Contin

						-					
	Posi (mid-	Position (mid-point							Id	P1ankton	
Tow	N.	of tow) to We Longe	Sub-	Date 1952	Time (C.S.T.)	Depth of tow (m.)	Volume water straimed in m ³	Volume (ml)	Volume ml/m ³ water	Fish Larvae no./m ³ water	Fish Eggs no./m ³ water
16	off Sanib	off Sanibel Island	SE	XI-IX	1530-1700	9	34.17	ъ	•1ŀ6	•000	• 000
17	E	8	SE	XI-18	0930 -112 5	м	67° 211	29	•683	°000	•000
18	26-45	82-35	SE	2 1−1 X	0830-1230	3-10	124.71	29	•233	• 160	. 890
19	27-25	82-50	SE	XI-IX	1245-1620	10	106.07	20	• 189	•056	1.055
20	26-04	82 - 21	SE	XI-23	0615-0715	lo	28 . 57	1 4	01L0	•105	•105
21	26-15	82-15	SE	XI-23	0755-1130	10	100°30	16	•160	• 009	•119
22	26–20	82-05	SE	XI-23	1220-1320	4	30°85	4	•130	•032	• 000
23	26-15	83-00	SE	XI-23	1515-2330	ъ	239°92	32	1 33	•062	• 004
24	26-28	83-56	SE	(I~23/2)	XI~23/2h 2340~0545	6-8	194.59	20	°103	• 298	•210
53	26-35	311mLi8	SE	XI-24	XI-2 ¹ ; 0600-1000	10	170°69	8	。047	•076	\$017
26	26-45	85-50	SE	XI-24	1020~1615	10-12	193 ° 75	Ъ	。026	•020	• 020
20	26-57	86-35	C	XI=24	XI=24 1630=2030	ω	126°54	60	• 063	.110	• 007
28	27-21	87-22	NC X	(I~2!;/25	XI~24/25 2040~0240	ĩn	184.89	3.4	°076	• C81	•016
29	27-30	88-21	NC	XI-25 0400	07100-0200	\sim	59°75	TT	•18h	• 083	° 000
*19	*Halfwspeed										

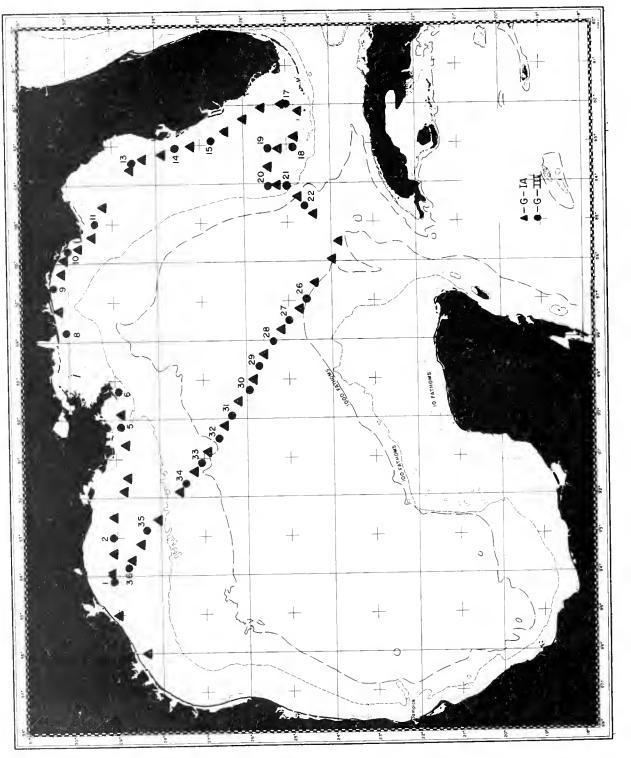




Table 10.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 8.

9-10 knots)
tows:
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speed
sampler;
(G-IA

	Pos niid-	Position (mid-point							ł	Plankton	
Tou	cf N. Lato	cf tov) t. W. Long.	Sub-	Da te 1953	Tire (C.S.T.)	Depth of tow (m.)	Volume water straired in m ³	Volume (ml)	Volume ml/m3 water	Tish Larvae no∘/m3 water	Fish Eggs no./m3 water
Ĺ	29-06	93 ~5 5	MN	II-12	1315-1715	2	1;(°911	4.8	•0µ1	•163	•722
0	29-05	93 - 25	MN	II-12	1725-2055	6	135•31	h•0	• 030	•103	•177
m	29-03	92-30	E MN	II-12/13 2235	2235-0405	ę	150-47	4.5	•030	•047	•465
7	28-50	91-50	NC	11 -1 3	0530-0830	8	84.98	4 . 5	•053	•094	L4.L.
ъ	28-1;1;	91-30	NC	II - 13	0850-1.050	8	57.87	3•0	• 052	. 380	•017
9	28-45	90-38	NC	II=13	1400-2040	10	183 . 95	10°0	• 054	•125	•419
7	28-51	89-53	NC	11-13/14 2212	2212 - 0245	ſ	129°42	26•0	•201	1 •035	•703
80	30-13	87-13	NC	II-14/15 2355	2355-0555	м	179 . 37	18•0	•100	•033	•151
6	30-1.0	86-15	NC	l - II	0722-1052	8	105 . 60	0°II	• 10h	•227	•03R
10	30-06	85-55	NE	11-17	1105–1255	: ∞	53.12	3•0	• 056	•075	•26l;
11	29-47	85-38	NE	II-18	0950-1250	5=10	86.77	ل ا ہ ر	•052	•519	• oh6
12	29-27	85 - 21	NE	II-18	1300-1700	10	110•114	8•5	°077	1 81	1.693
13	29–12	84=32	NE	II-18/19 1825	1825-0115	6-8	145 •65	5 ° 0	•034	•027	7 ° 271
ήτ	28-36	83–36	NE	11-19	0725-1025	10	99.87	5•0	• 050	•280	1.071
15	28-20	83-22	NE	II-19	1225-1525	10	93•69	0°3	• 003	• 032	•320

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aof.	Pos (mid of	Position (mid-point of tow)	Sub-	- Da to	T' lao	Depth of	Volumo Water	ountoA	Volumo	PLankton Pish Larvao	F 131, 16.073
	N. Lat.	N. Lat. W. Long. Area 1953 (G.G.G.T.)	Area	4_1943_	((),1,1,1,))	Low (m.)	atrained in m3	(ml)	mil/m ³ water		no./mJ water
91	27-13	83-15	NF	6 [-] [1661-1651 61-11	10	101°53	0.5	¢ (۲) ار (61.0 °	2.168
17	27-13	83-02	Мŀ	11-19/20	11-19/20 2130-0330	۲	175.33	8.0	∿الا	112.	•369
1.8	26-26	82-1,0	SE	11-20	11-20 0514+0930	ę	102.653	10°0	•098	\$UQ	062.
61	26-00	82-20	SIC	0.5-1.1	11–20 0940–1220	в	71°17	l₁•∩	•046	• 098	1.•00h
20	25-25	82-01	SE	06-11	5021+50E1 06-11	10	11.8 . 61	9 °C	•080	•081	0£ <i>ا</i> 1ء
21	25-06	82-00	SE	II~20	17-20 1720-1940	$ \mathbf{r} $	5E•51.	9 ° 0	• 128	.128	4.733
22	214-113	82-10	SE	1 I+02	515T-080T	۲	1/1/10	0°6	• 0 62	9L0 °	£26*
23	211-50	82-118	SE	1 1− 55	1425-1816	10	85,056	9•0	•020	•281	2 . 606
211	25-12	83-08	SF	11-22/23	11-22/23 1955-0025	ŗ.	134.89	13•0	•096	200°	2.098
25	25-27	83-35	SIS	П-23	II-23 0145-0615	ъ	1.33°,12	12•5	•091	° 112	1:27
26	21/-11	814-02	SE	11-23	11-23 0840-1150	12	97.60	3 • 0	•031	010	190•
27	211-116	84-13	S E S	11-53	11-53 13)+4-1922	10	87 。 115	1.0	τισ•	•023	• 000
28	211-23	82 : –1,7	SE	11-23/211	11-23/24 2300-0310	11	11,10.56	2.0	°01)	i(10•	700 .
29	23-50	85-23	SE	11-211	11-5h 0635-11h5	12	1/1/1°61	3 ° 0	•021	o118	•02B
30	23-27	85-20	SF,	11-21	11-51 1310-1750	12	123-39	3•0	• 021	°032	•000

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	Pos mid	Position (mid-point							P1	Plankton	
Tow	of N. Lat.	of tow) to Wo Longo	Sub- Area	Sub- Date Area 1953	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volume ml/m ³ water	Fish Larvae no./m3 water	Fish Eggs no./m ³ water
31	24 - 25	86-34	С	[I- 24/25	II-24/25 2125-0035	12	85•38	3°0	• 03K	7.40.	•012
32	24-45	87-14	C	11 - 25	1 1- 25 0350-0810	٢	130.117	3.0	•023	•069	•0146
33	25 - 10	87 - 44	C	1 I ~5 2	11-25 1145-1340	12	61•09	1.0	•017	• 098	• 016
34	25 34	88-22	U	11 -2 5	11-25 T640-1940	12	83 . 53	6•0	•072	•539	•012
35	25 -1 50	89-00	C C	11 - 25 /26	11-25/26 2205-0120	v	97 . 21,	7.0	•072	•031	בווס•
36	26-11	89–35	C	II 26	II 26 03200800	ъ	123 . 51	7•0	• 057	138	•000
37	26-31	90-11	c	II - 26	TI-26 1035-1345	10	814 . 95	2 ° 0	•02l	•024	•012
39	27-15	91-20	NC I	11-26/27	II-26/27 22145-0400	e	143 ° 55	211.00	•167	700 a	110.
140	27 - 3 ^r 5	9 1- 20	NC	11-57	11-12 001-1290	10	98 . 75	12 •5	•127	1.ilo.	• 020
11	28-0l _t	92-56	MN	1.1-27	11-27 1010-1400	10	115 • 33	9•0	•078	° 139	•139
1,12	28-29	93-10	MN	11-27	1516-1834	10	135.69	1.2 •0	•088	•560	•766
113	28- 40	93-37	Mu	11-27	11-27 1838-2038	ч	59 . 11	1400	•068	•186	2•55
111	29-07	93-56	MN	11-27/28	11-27/28 2255-0120	æ	107.33	2.0	•013	•075	•391

Table 11.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 8.

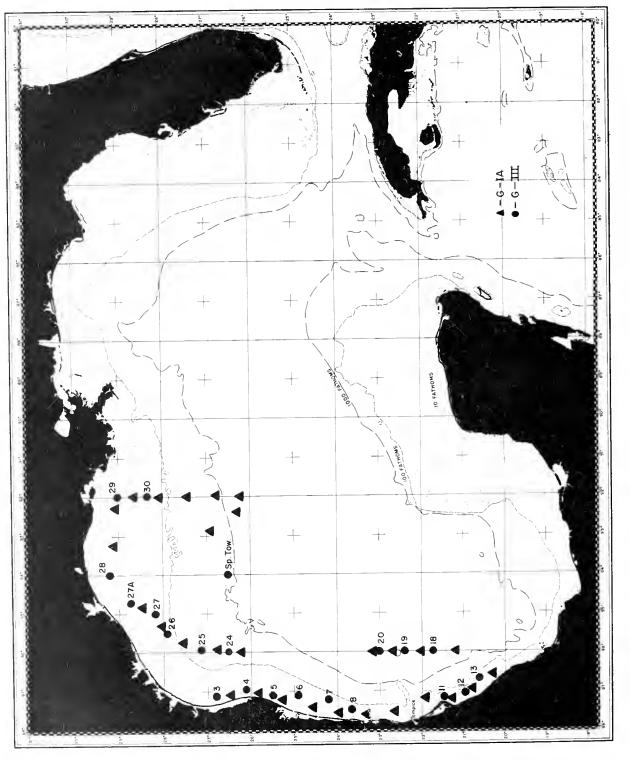
(G-III sampler; speed of tows: 4-5 knots)

				30-	30-minute tows Time	Ś			P	Plankton	
Sta- tion	1 No Late	Sta- Position tion N. Lat. W. Long.	Sub- Area	Date 1953	(start) (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volume ml/m ³ water	Fish Larvae no./m ³ water	Fish Eggs no./m ³ water
Ľ*	29-05	0 L- ‡6	MN	II-23	0200	ę	336.42	30•0	•089	•699	•012
13	28-33	83–26	NE	11-19	1150	IO	245.33	95.0	•387	•183	•289
τţ	27-35	83-05	NE	61-11	2040	٣	309 • 69	49•0	•158	•297	1.724
Я	26-45	82 - 55	SE	II-20	0430	ъ	353•39	60 • 0	•170	•240	•430
17	25 - 00	81 -5 8	SE	II-20	2100	у	201.00	0•11	•204	•294	1 •065
18	24-52	83 03	SE	II - 22	1915	ъ	294.19	1 1 •5	דוןז.	。 122	•619
19	25-27	83-05	SE	II - 23	οττο	e	386.67	62•0	•160	•316	•978
20	25 - 27	84-02	SE	II-23	0815	10-12	289 . 63	23.0	• 079	• 193	•021
21	25-00	34-02	SE	II - 23	1245	IO	369•92	26•5	•072	•027	011
22	24-36	84-32	SE	II-23	2210	6	265 •50	26•5	•100	• 045	• 030
26	24 - 35	86 - 52	C	II-25	0315	ſ	286.53	32•0	•112	•171	•063
27	25 - 00	87–31	C	II - 25	OTOT	10	281.18	10.0	•036	•235	.011
28	25–21	88 - 01	c	11 - 25	1605	lo	407.16	20•0	°049	•260	•017
29	25 <i></i> 113	38-J ₄ 0	U	II-2K	2130	e	405°77	8 1. 5	•201	. 113	•190

(Continued)
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TA BLE

Depth of tow (m.) Volume water value Volume value Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volume Volu	1				30-	30-minute tows Time				Pla	Plankton	· · · · · · · · · · · · · · · · · · ·
39-17 r $11-26$ 3315 3 $305,00$ $60,0$ $89-54$ c $11-26$ 1000 $8-10$ $261,-23$ $20,0$ $89-56$ r $11-26$ 1555 10 $261,-23$ $20,0$ $91-60$ Nc $11-26$ 2210 3 $226,30$ $56,0$ $91-60$ Nc $11-27$ 0600 10 $261,43$ $13,56$ $91-61$ Nc $11-27$ 0600 10 $261,43$ $13,56$ $92-50$ NM $11-27$ 2120 3 $394,616$ $19,0$ $92-50$ NM $11-27$ 2120 3 $19,0$ $19,0$ $92-60$ NM $11-27$ 2152 $51,0$ $19,0$ $19,0$ $92-60$ NM $11-27$ 2152 $50,0$ $19,0$ $19,0$ $92-61$ NC $11-1,12$ $214,0$ $214,0$ $11,0,0$ $19,$		Poe	sition W. Long.	Sub- Area	Date 1953	(start) (C.S.T.)	Depth of tow (m.)	Volume water strained in m3	Volume (ml)	Volume ml/m3 water	Fish Larvae no./m3 water	Fish Eggs no./m ³ water
89-5/4 c $IT-26$ 1000 $8-10$ $261-23$ $20-02$ $20-12$ $21-27$	N	5-56	89 -1 7	ر	II-26	0315	e	305.00	60 ° 0	.197	•623	•010
90-30 c $1T-26$ 1555 10 258.02 60.0 $91-06$ Nc $11-26$ 2210 3 35.0 35.0 $91-06$ Nc $11-27$ 2600 10 266.30 35.0 $91-06$ Nc $11-27$ 0600 10 261.043 13.5 $92-50$ Nc $11-27$ 0100 349.5 19.0 $92-50$ Nc $11-27$ 2120 3 394.615 19.0 $92-50$ Nc $11-27$ 2120 3 394.615 19.0 $92-90$ Nc $11-27$ 2120 3 394.615 19.0 $92-90$ Nc $11-12$ 2125 6 19.0 19.0 $92-910$ Nc $11-12$ 2140 32.1 119.0 $92-91$ Nc $11-12$ 2160 33.0 32.0 32.0 32.0 32.0		:6-21	89-54	U	II-26	1000	8-10	261 . 23	20•0	27C.	.161	•00
91-06 NG IT-26 2210 35.0 <t< td=""><td></td><td>56-40</td><td>90-30</td><td>Ð</td><td>11-26</td><td>1555</td><td>10</td><td>258.02</td><td>60°0</td><td>•233</td><td>•012</td><td>*00Jt</td></t<>		56-40	90-30	Ð	11 - 26	1555	10	258 . 02	60°0	•233	•012	*00Jt
91-lo Nc $II-27$ 0600 10 $26lield$ 113.5 $92-50$ Nw $II-27$ $1lld$ 10 $3l.9.25$ $lf.6.0$ $93-ld$ Nw $II-27$ 2120 3 $39la.16$ 19.0 $33-ld$ Ist II 212 2120 3 $39la.16$ 19.0 $29-dot$ Ist dw $II-27$ 2120 3 $39la.16$ 19.0 $29-00$ Nw $II-12$ 2156 6 10 19.0 $99-dot$ $II-12$ 2156 6 10 19.0 $99-dot$ $II-12$ 2156 6 10 19.0 $99-dot$ $II-12$ 2156 6 2315 2100 $99-dot$ $II-12$ 2156 6 2315 22.0 $87-ld$ NC $II-12$ 2315 3 22.0 $87-ld$ NC $II-17$ 056 6 230.0 $85-lo$ NC $II-17$ 1330 6 36.0 $85-lo$ NE $II-17$ $II-17$ 5 50.0		27 - 05	91-06	NC	II - 26	2210	ę	226*30	35 •0	• 155	•000	000•
$92-50$ NW $IT-27$ $IJJ5$ $I_{1}6,0$ $3!9,25$ $I_{5},0$ $33-40$ NW $IT-27$ 2120 3 $394,a16$ $19,00$ $33-40$ MW $IT-27$ 2120 3 $394,a16$ $19,00$ $ocrupied$ Iast due to adverse weather $adverse$ $adverse$ $19,00$ $ocrupied$ Iast due to adverse weather $adverse$ $adverse$ $19,00$ $93-00$ NM $IT-12$ 2156 6 $19,00$ $19,00$ $90-11$ NC $IT-12$ 2150 5 $10^{-11,00}$ $33,00$ $89-18$ NC $IT-12$ 2160 3 $22,00$ $111,00$ $86-33$ NC $IT-12$ 0503 6 $233,00$ $101,00$ $22,00$ $86-30$ NC $IT-12$ $233,00$ $111,00$ $22,00$ $22,00$ $22,00$ $36,00$ $85-40$ NE $IT-12$ <td< td=""><td></td><td>27-26</td><td>91-ho</td><td>NC</td><td>II-27</td><td>0090</td><td>10</td><td>264.113</td><td>113•5</td><td>•429</td><td>•284</td><td>•015</td></td<>		27-26	91-ho	NC	II-27	0090	10	264.113	113•5	•429	•284	•015
$33-46$ NMII-27 2120 3 $394_{0}-16$ $19_{0}0$ $occupied$ $1ast$ dueto adverse veather. $occupied$ $1ast$ dueto adverse veather. $93-00$ NM $11-12$ 2155 6 $93-01$ NC $11-12$ 2156 6 $90-11$ NC $11-12$ 2160 3 $90-11$ NC $11-12$ 2160 3 $89-18$ NC $11-12$ 2160 5 $89-18$ NC $11-12$ 2160 5 $89-18$ NC $11-12$ 2315 3 $86-33$ NC $11-12$ 2315 5 $85-40$ NE $11-12$ 1330 6 $35-00$ NE $11-12$ 7 5 $35-00$ NE 1745 5 7 $35-00$ NE 1745 5 5		28 - 21	92-50	MN	11-27	1445	10	349.25	l45 • 0	。 129	•598	3.926
occrupied last due to adverse weather. 93=00 NM II=12 2155 6 93=01 NC II=12 2155 6 90=11 NC II=12 2140 3 89=18 NC II=16 2315 10 87=47 NC II=16 2315 3 86=33 NC II=17 0650 6 85=40 NE II=17 1330 6 35=00 NE II=18 1745 5		28-45	93-48	MN	II-27	2120	ę	394.16	1 9 ° 0	o 018	•066	2 ° 763
Qualitative toxs 93-00 NM II=12 2155 6 93-01 NC II=12 2140 3 90=11 NC II=13 2140 3 89-18 NC II=14 0705 10 87-47 NC II=16 2315 3 86-33 NC II=17 0650 6 85-40 NE II=17 1330 6 35-00 NE II=18 1745 5	÷		ccupied las		to advei							
93-00 NV II-12 2155 6 90-11 NC IT-13 21h0 3 89-18 NC II-14h 0705 10 87-4i7 NC II-16 2315 3 86-33 NC II-17 0650 6 1 85-40 NE II-17 1330 6 1 35-00 NE II-18 1745 5 1						Qua		SAC	volume (ml)		No. of Larvae	No. of Eggs
90-11 NC IT-13 21h0 3 89-18 NC IT-14 0705 10 87-47 NC IT-16 2315 3 86-33 NC IT-17 0650 6 1 85-40 NE IT-17 1330 6 1 35-00 NE IT-18 1745 5		29=06	9300	MM	II12	2155	9		19.0		16	530
89-18 NC II-14 0705 10 87-47 NC II-16 2315 3 86-33 NC II-17 0650 6 1 85-40 NE II-17 1330 6 3 35-00 NE II-18 1745 5		28-54	90 =11	NC	II-13	2140	e		33°0		39	18
87-417 NC II-16 2315 3 86-33 NC II-17 0650 6 1 85-40 NE II-17 1330 6 3 35-00 NE II-18 1745 5		28-55	89-18	NC	TT-TT	0105	10		2017		25	21
86-33 NC II-17 0650 6 5 1 85-40 NE II-17 1330 6 5 35-00 NE II-18 1745 5		30-95	87-47	NC	I1=16	2315	e		22°0		l	25
85-40 NE II-17 1330 6 35-00 NE II-18 1745 5		30-20	86-33	NC	11-11	0650	9		117°0		46	27
35-00 NE II-18 1745 5		30-00	85-40	NE	TI-17	1330	9		36.0		31	36
		2925	35-00	ME	II-18	1745	ĩ		24.0		34	412





	Poi Poim)	Position (mid-point							đ	Plankton	
Tow	N. La	of tow) t. W. Long.	Sub- Area	Date 1953	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (r.1)	Volume ml/m3 water	Fish Larvae no./m ³ water	Fish Eggs no./m ³ water
							Cruise 9				
r-1	29-00	95-00	MN	6 - 111	III-9 1740-2110	8	01.0011	6 •0	•054	.282	3),6
2	28-20	96 - 00	MN	111-10	0170-0540-0710	ಖ	59•36	6 •0	•101	.118	.084
						U	Cruise 10-2B				
2	26–28	92 - 06	MC	IV-15	1735-2055	စ	103.47	7•0	•073	•213	7.123
3	25-50	97-02	WC I	V-15/16	IV-15/16 2205-0220	ε	150 . 58	12.0	•080	•l18	2 . Mố
	25-16	ΫΤΞ=- 26	MC	91-1I	IV-16 0335-0635	ς	98°79	12 . 5	.127	1,99h	361
	21 1- 314	97-25	WC	IV-16	IV-16 0800-1100	8	99.80	2°2	202 r		
	23-58	97-32	MS	1V-16	1220-1515	တ	99 。 72		-035 -035	111) •	105.
	23-20	75-37	SW	IV=16	1635-1955	Ø	1.13.63	U° T	U3C	3(0)	140
	22-38	97-31	LT MS	V-16/17	IV-16/17 2120-0050	IJ	11.3 •08	ې د	•031	-26K	• 100
	21-55	11-16	MS	Tumli	0140-0410	Г	181 . 54	0°0	210	(C)(0000
	21-17	97-13	MS	THIT	0920-1220	10	97.63	1,• 0			
	20-46	965	SW	LTWT	1335~1800	IO	122°68	6 0	570°	0 TTO	נµל∙ חוב
	20-17	96-35	SW		1925-2210	20	93 •57	2°2	•027	.235	•52h

Table 12.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruises 9 and 10-2B.

(G-IA sampler; speed of tows: 9-10 knots)

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Tow	Pos: (mid- of	Position (mid-point of tow)	Sub-	1	Time	Depth of	Volume water	Volume	I Volume	Plankton Fish Larvae	Fish Eggs
	N. Lat.	W. Long.	Area	1953	(C.S.T.)	tcw (m.)	strained in m ³	(Tm)	ml/m2 water	no./m ^J water	no./m water
13	21-10	96-00	MS	IV-18	0830 - 1245	10	129 . 89	2 •5	•019	•077	•000
14	22-00	00 − 96	MS	IV-18	1525 1825	10	104.16		•003	•029	•058
Ъ	22-41	00 - 96	SW	[V-18/19	IV-18/19 2135-0105	Ø	118.19	2 •J	•021	•059	•042
1 6	23-10	96-00	MS	17-19	0345-0618	у	81.96	3 •5	•043	• 098	,11 0
17	26-13	96-00	MC	IV-20	1435 ~1 820	10	105°99	3 ° 0	•028	• 113	. 038
13	26- 46	95-55	WC	IV-20	2100-0000	у	99 . 47	3•0	• 030	•030	•020
19	27-34	95 - Lil	MC	IV-21	0225-0605	м	121•33	5•5	•0h5	•025	•058
20	28-02	95 20	MN	IV-21	0805 - 1125	10	106.25	4 . 0	•038	•527	•602
21	28-28	91-20	MN	IV-21	1248-1702	10	144°42	8•5	•059	1.115	3•005
22	29-07	93 - 15	NI WN	1-30/V-1	NW IV-30/V-1 2200-0600	м	21,2,62	2 1. 6	•089	1.884	2.180
23	29-05	92 - 15	MN	V 1	0610-0920	10	109.74	12 • 5	יוננ.	•301	6.238
24	28 - 10	92-00	MN	L.V	1055-1435	10	108,12	7•5	•069	·435	•953
25	28-05	92 - C0	MC	V ⊷1	1445 2025	10	157 . 64	3 •0	•019	קנו.	•159
26	27-21	6 5-1 6	NC	V-1/2	2215 - 03lı5	10	71,241	8 . 0	•056	•007	091

	Pos: (mid	Position (mid_noint							[Plankton	
Том	of	of tow) Sub- Date Time	Sub-	Date	Time	Depth of	Depth of Volume water Volume Volume Fish Larvae Fish Eggs	Volume	Volume	Fish Larvae	Fish Eggs
	N. Lat.	We Lung.	Area	1953	(C.S.T.)	tow (m.)	strained in m	(m1)	ml/m water	no./m/ water	no./m/ water
27	27 26-46 91-53	9 1- 53	NC	V - 2	0605-1005	10	105 . 06	ч С	410.	•086	。1 24
28	26-15	92 -00	c	V-2	1330-1720	10	113°24	Р• С	•013	• Chili	260°
29	26-18	92 - 23	MC	V.	0810 - 1155	10	124.16	1. 0	• 008	•032	•010
ŝ	30 26 - 55	92-52	WC	V-3	1250-1800	10	168.60	2•S	•015	•030	•042

(Continued)	
12	
TABLE	

Table 13.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 10-2B.

_
knots)
4-5
tows:
of
speed
sampler;
(G-111

Station	Position N. Lat. W.	tion W. Long.	Sub -A rea	Date 1953	Time (start) (C.S.T.)	Depth of tow (m.)	Volume in (ml)	Plankton No. of Fish Larvae	No. of Fish Eggs
9	26-48	97-07	WC	IV-15	1700	æ	111.0	137	677
ţ,	26-08	96 - 58	WC	IV-IS	2 1 30	ſ	لىك ە ت	368	349
м	25-30	90-16	ыM	IV-16	00£0	e	50 . 5	509	2668
6	24-55	90-16	MC	9 T- 11	0£70	α.	35 ∙ 0	498	384
7	24-13	97 - 21	MC	<u> </u>	1145 J	¢¢.	15•5	1,22	2119
co	23–40	97-30	ыS	Tr -1 6	1600	٢	17.0	469	323
11	21-28	0 1- 26	MS	71⇔17	ORli5	10	15.0	228	337
12	20-53	60-72	MS	1V-17	1300	10	28 ° 0	91L9	435
13	20-37	14-96	SW	γ - υγ	1850	ల	20•0	1669	137
16	21-42	96-00	MS	T7-13	1450	10	11.0	128	33
17	22 - 23	96-00	MS	SI-VI	2105	10	23•0	52	า
c2 F1	53-00	56-00	B	SI-VI	CIEO	m	ະ ດີ ເມ	16	5
55	26-31	00-96	04	TV-20	2030	m	20°C	31	26
رى ئ	27-08	95-58	MN	TV21	0150	ς	12 %	ω	c) 20

TABLE 13 (Continued)

								Plankton	
Stati on	Pcsi	tion	Sub-Area	Date	Time (start)	Depth of	Volume in	Nr. of Fish	No of Fish
	N. Lat.	N. Late W. Long.		1953	(C.S.T.)	tow (m.)	(T ^u)	Larvae	Edes
26	27-55	95-30	MN	17-21	0800	1 0	13•0	154	402
27	28-10	95-00	MM	IV-21	1 215	JO	19 • 0	526	1087
27A	28-44	94-44	MN	TV-21	1710	10	36•5	174	1217
28	29-12	94 - 00	MN	IV-30	2127	e	177.0	381	428
29	29-01	92⊷00	MN	TV+31	1005	10	110.0	8	514
30	28-20	92-00	Mar	TV~31	1520	JU	20°0	63	138
Special tow	26-32	92-29	WC	V-3	1200	10	20.0	Эç	29

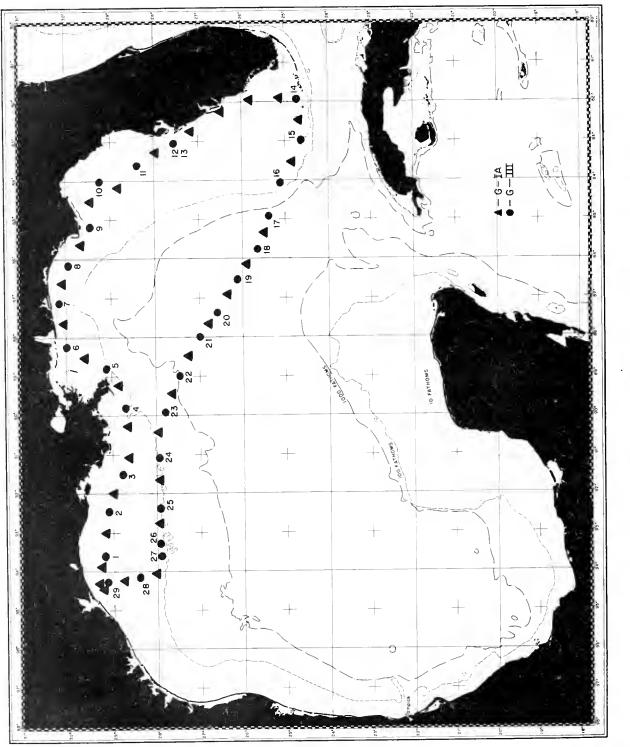


Figure 11.--Location of plankton tows made during Cruise 11, May-June 1953. Numbers identify stations.

Table 14.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 11.

(G-IA sampler; speed of tows: 9-10 knots)

	Pos (mid	Position (mid-point							P1	Plankton	1
Tow	of N. Lat.	of tow) t. W. Long.	Sub-	Date 1953	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m ³	Volume (ml)	Volume ml/m ³ water	Fish Larvae no./m ³ water	Fish Eggs nc./m3 water
Ч	29-19	94 - 19	MN	V - 27	1510 ~ 2010	15	124.42	30•0	נו/2•	1 21	5.176
N	41 - 62	93-53	MN	V - 28/29	2225-0420	м	169a03	55.0	•325	•544	•935
m	29-10	9 3 0 1	MN	V - 29	0500-1350	15	180 • 74	27.0	e1 119	•155	5 ° 234
Ц	28 - 56	92-00	NC	V - 29	1135-1735	15	184.07	2 1 •0	411.	•054	•255
ъ	28 - 36	9 1- 04	NC	V-29	1815-2355	15	228 . 92	10.0	•044	°039	•297
9	28-37	∠1− 06	NC	V - 30	0030-0605	1 5	L4-71	23 ° 0	1 23	•320	•651
7	28-50	t1-68	NC	0€ − 30	0645-1300	15	164.27	18•0	•110	• 262	55.719
8	29 - 35	88-32	NC	0€ - 30	1 346–1944	٦ç	158•29	82•5	•521	•505	1.826
\$	30-04	87-40	NC	V-30/31	2018-0213	ъ	165.69	2000	1 21	•1 09	1.183
10	30-07	86-38	NC	V - 31	0245-0850	Л	196 。 22	25°0	•127	•194	•683
ΙI	29-41	R5-39	NE	V-31	0928-1528	15	162°43	28 . 0	•172	•215	•738
77	29-27	34-34	IN	V=31	1710-2319	JC	1921 0 56	28 . 0	•1)‡l4	•361	2 . 303
13	28-49	84-12	NE V.	NE V-31/VI-1 2352	2352-0550	Ъ	181.38	20°0	110	•102	4.571
14	27-58	33-15	NE	THIN	0628-1220	15	168.01	28•0	。 167	•179	1.160

Ì	Post /	Position							P1	Plankton	
Тоw	of of N. Lat.	of tow) t. W. Long.	Sub- Area	Date 1953	Time (C.S.T.)	Depth of tow (m.)	Volume water strained in m3	Volume (ml)	Volume ml/m3 water	Fish Larvae no./m3 water	Fish Eggs no./m3 water
15	27-12	82-44	NE	τ ι ΙΛ	1046-1646	м	162 . 18	25°0	•154	•080	1 •085
16	26-30	82-15	S S L	τ γ− ΙΛ	1707-2308	ъ	157.56	22°0	₽139	•3214	1.761
17	25 ~5 0	81-58	SE V	Λ Ι− μ/5	2319-0519	w	1 16605	21.0	ئلباد	3 . 923	6 . 1 <u>,</u> 29
13	25 -08	81 - 54	SE	ζ ⊷ ΓΛ	6201-17/20	ъ	146.25	26.0	°178	1.415	3•323
19	24-42	82-30	SE	2-IV	0750-1350	ъ	186 . 87	5 . 0	•027	e40°	3 . 462
20	21 1 - 5 2	83-33	SE	L−IV	1745-2340	м	150.94	7•0	• 0µ6	•126	• 815
22	25 - 31	85 - 21	SE	VI-8	0654-1254	TO	191,12	1 •5	•008	•084	•078
23	25 - 55	86-09	c	0-IV	1330-1930	10	191. 15	3•5	•018	•251	0 26
21,	26-22	86-57	C	VI-8/9	2007-0207	w	189 . 43	0.11	•058	121.	•053
25	26-47	14-78	С	G⊷IA	1480-1420	ъ	184•93	5•0	•027	•103	•103
26	27 - 15	88-29	NC	6 - IN	0928 - 1543	10	194 . 83	3•5	•018	. 103	דויס•
27	27-38	89-26	NC	δ - IΛ	1620-2220	IO	185 . 32	13 ° 0	•070	•086	\$00 °
28	27-57	90-27	NC	VT - 9/10	2252 0452	ъ	193 °51	13.0	•067	1 71	ιτή•ι
29	27-57	07-16	NC	01-IV	05211-7220	JO	195 . 63	14 0 0	•020	•169	•654
30	27-57	92 - 45	MN	Ο Ι- ΙΛ	1200-1700	10	167 . 18	4.0	• 024	•233	•185
31	28-02	94-04	MN	II/OI-IV	VI-10/11 2111-0311	ъ	168 . 38	8°0	240°	•290	•468
32	28-45	ካርመካሪ	MN	LL-IV	0315-0715	v	105°49	9 ° 0	•085	•683	2.104
33	29-13	94-26	MN	LL-IV	0931-1201	ъ	77.52	5•0	•064	31 0	3 ° 070

TRBLE 14 (Continued)

Table 15.--Station data, total volumes of plankton and volume of fish larvae and eggs, Cruise 11.

(G-III sampler; speed of tows: 4-5 knots)

				30	30-minute tows			Plankton	
Tow	Posi	Position	Sub-area	Date	Time (start)		Volume in	Nc. of Fish	Nc. of Fish
	N. Lat.	W. Long.		1953	(C.S.T.)	tow (mo)	(Tm)	Larvae	Eges
Ч	29-12	93 - 35	MN	V-29	0430	Ŋ	0°141	30	265
2	29-07	92 26	WM	0 2- 4	1100	l	38°0	31	2850
e	28-46	91-31	ON	6 2- 1	1742	15	28•0	33	34
4	28-42	89 - 48	NC	NE-1	0608	10	63 . 5	1043	66
м	29-07	88-47	ON	02-i	J . 15	15	18•0	52	26
9	29-59	63-14	NC	Oź⊷A	1 945	ъ	1 59 . 0	115	117
7	30-09	87-07	NC	LEMI	0215	Ъ	36.0	22	4
Q	5-52	36-09	2 M	1€ ⊷31	0855	15	140.0	63	2 15
6	29-27	85-10	NF	V-31	1529	10	37 ° 5	27	1 68
10	29 - 15	10-17	ME	V=31	2320	Ľ١	60°0	159	623
11	28-23	83-37	EN	THIM	0555	15	0.04	206	2063
ý,	27	83=03	NE	T== T T	1222	1.0	Ğ•∪ğ	350	3ġç
ET.	27-33	83-03	NF	₩ ፲ − <u></u> [†	1013	CL	110 ° 0	94	353
11	24-12	21 EC	E5	רב <u>ה</u> איני היג 1	T OF C	GT	86°0	ć3	233
2-1	24-37	83-00	SE	1IA	1353	٢	0•7	123	352

				30-	30-minute tows			Plankton	
					Time		Volume	No. of	No. of
Tow	0	Position	Sub-area	Da te	(start)	Depth of	h	Fish	Fish
	No Lato	W. LOUGO		CCKT	(01000)	LOW (Me)	(<u>m</u>)	Larvae	898a
16	25-07	84-03	SE	VI-7/8	2344	у	30•0	32	184
17	25 - 25	84-55	SE	Δ-1-9	0622	IO	31 . 5	66	204
18	25-41	85–115	SE	VI-8	1257	IO	13 • 5	182	39
19	26-08	46 - 34	U	VI-8	1934	ъ	40.0	175	17
20	26-36	87-23	U	6 - IV	0209	м	51.0	68	22
21	27-00	88-00	C	6-IV	64130	10	10 •0	60	77
22	27-27	89-00	NC	6 IA	1546	10	29 •5	L I5	29
23	27-48	89 -5 5	NC	6-IV	222I	м	48•O	84	102
24	27-56	91-06	NC	Οι-ΙΔ	olt55	10	0•ाग	323	95
25	27-56	92 - 16	MN	ot-IV	112 8	10	20.0	300	167
26	27-56	93-16	MN	OI-TV	1722	1 0	33 ° 0	183	102
27	27-55	93-35	MN	OT-IV	2040	ъ	28 • 0	ניוויו	3795
28	28-24	94-09	MN	11 - 11	0313	w	65•0	374	311
29	29-07	9 4- 16	MN	IT-IV	0858	у	51 •0	288	199

TABLE 15 (Continued)

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TABLE 16 (A)

G-IA Net (Quantitative)

		-100 fms.		1	00-1000 f	ns.	OVer	1000 fms	0
Sub-area	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall
NW	•055 (10)	•104 (14)		•009 (2)					
NC	•094 (6)	•142 (17)	•152 (3)	•113 (4)	•061 (11)	•074 (1)	•091 (2)	•05年 (年)	•096 (6)
NE	•040 (8)	•146 (11)		•025 (1)	•063 (4)		•056 (1)		
WC		•065 (5)			•029 (4)			•008 (1)	
С							•038 (9)	•050 (8)	.063 (1)
Ca	.014 (3)			•054 (3)			•015 (1)		
SW		•034 (7)						•023 (4)	
SE	•074 (12)	•135 (10)	•191 (16)	•032 (5)	•015 (1)	•047 (1)	•049 (7)	055 (11)	.026 (1)
Means	•060 (39)	•115 (64)	•185 (19)	•054 (15)	•053 (20)	•961 (2)	•047 (20)	•047 (28)	•083 (8)
All Seasons		•109 (122)			•054 (37)			•052 (56)	

Plankton Volumes (ml./m3)

() No. of tows

Winter-12/21-3/20

Spring--3/21-6/20

Fall--9/21-12/20

Fish	Larvae	$(no./m^3)$
I TOU	Durvac	(110./11 /

	0.	-100 fms.		10	00-1000 fr		OVO	er 1000 fr	
Sub-area	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall
NW	•188 (10)	•493 (14)		011 (2)					
NC	•316 (6)	•443 (17)	•749 (3)	•102 (4)	•181 (11)	•080 (1)	•095 (2)	•191 (4)	•052 (6)
NE	•176 (8)	•429 (11)		•025 (1)	•187 (4)		•034 (1)		
WC		•696 (5)			•025 (4)			•032 (1)	
С							•115 (9)	•166 (8)	.110 (1)
Ca	•032 (3)			•199 (3)			•000 (1)		
SW		•482 (7)						•066 (4)	
SE	•127 (12)	1.142 (10)	•072 (16)	•046 (5)	•068 (1)	•076 (1)	•025 (7)	•135 (11)	•020 (1)
Means	•174 (39)	•585 (64)	•182 (19)	•085 (15)	•145 (20)	•078 (2)	•072 (20)	•138 (28)	•055 (8)
ll Seasons		•391 (122)	<u></u>		•117 (37)			•102 (56)	

Winter-12/21-3/20

Spring--3/21-6/20

	0	0-100 fms.			100-1000 fms .			over 1000 fms.		
Sub-area	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	
NW	•593 (10)	2•389 (14)		•000 (2)						
NC	•245 (6)	4.002 (17)	•404 (3)	•030 (4)	•151 (11)	•006 (1)	•016 (2)	•033 (4)	•004 (6)	
NE	1.686 (8)	1.285 (11)		025 (1)	•077 (4)		•011 (1)			
WC		2.006 (5)			。040 (4)			•040 (1)		
C							•017 (9)	048 (8)	•007 (1)	
Ca	•062 (3)			•029 (3)			•000 (1)			
SW		•482 (7)						•052 (4)		
SE	1.125 (12)	1.9 16 (10)	•166 (16)	•000 (5)	.012 (1)	•017 (1)	•005 (7)	•043 (11)	•020 (1)	
Mean ⁵	•886 (39)	2。301 (6年)	•204 (19)	•015 (15)	•107 (20)	•012 (2)	•012 (20)	•044 (28)	•006 (6)	
All Season	13	1.522 (122)			•065 (37)			•027 (56)		

Fish Eggs (no./m³)

Winter-12/21-3/20

Spring-3/21-6/20

Fall--9/21-12/20

	0-100	fms.		00 fms.	over 1000 fms.	
Sub-area	Winter	Spring	Winter	Spring	Winter	Spring
NW	•089 (3)					
NC		•373 (2)	•292 (2)	•092 (9)		•150 (1)
NE	°27 2 (2)	•175 (8)		•105 (2)	•101 (1)	.1 30 (1)
C					•129 (7)	•111 (5)
Ca			•341 (1)		•141 (1)	
SE	•154 (8)	•173 (4)	•173 (3)	•070 (3)	•079 (3)	•091 (8)
Means	. 157 (13)	•203 (14)	.241 (6)	•089 (14)	•114 (12)	•104 (15)
Both Seasons		171 27)	•135 (20)		•109 (27)	

Plankton Volumes (ml./m³)

() No. of tows

Winter--12/21-3/20

Spring--3/21-6/20

TABLE 17 (B)

	0-100	fms.	100-10	00 fms.	over 1000 fms.	
Sub-area	Winter	Spring	Winter	Spring	Winter	Spring
NW	•454 (3)					
NC		1•558 (2)	•146 (2)	•458 (9)		•129 (1)
NE	•240 (2)	3 . 032 (8)		•282 (2)	•220 (1)	•467 (1)
C					•239 (7)	•390 (5)
Ca			2•056 (1)		•427 (1)	
SE	•854 (8)	•686 (4)	•808 (3)	•238 (3)	•118 (3)	•253 (8)
Means	•667 (13)	2.151 (14)	•795 (6)	•386 (14)	•221 (12)	•305 (15)
Both Seasons		1.436 (27)		•509 (20)		268 27)

Fish Larvae (no./m³)

Winter--12/21-3/20

Spring--3/21-6/20

	0-100	fms.	100-10	000 fms.	over 1000 fms.	
Sub-area	Winter	Spring	Winter	Spring	Winter	Spring
NW	2.234 (3)					
NC		3•913 (2)	•008 (2)	•107 (9)		•009 (1)
NE	1.007 (2)	•581 (8)		•008 (2)	•036 (1)	•029 (1)
С					•043 (7)	•031 (5)
Ca			.021 (1)		•042 (1)	
SE	•6µ1 (8)	1.655 (4)	•004 (3)	•106 (3)	•012 (3)	•028 (8)
Means	•988 (13)	1•364 (14)	•008 (6)	•093 (14)	•034 (12)	.028 (15)
Both Seasons		5183 27)		.067 20))31 ?7)

Fish Eggs (no./m³)

Winter--12/21-3/20

Spring---3/21-6/20

Depth	Plankton (ml_{o}/m^{3})		Fish Larvae (no./m ³)		Fish Eggs (no./m ³)	
Zone	G-IA	G-III	G-IA	G-III	G-IA	G-III
0-100 fms. Tows	•109 (122)	•171 (27)	•391	1.436	1,522	1.183
100-1000 fms. Tows	•054 (37)	•135 (20)	•117	•509	•065	°067
over 1000 fms. Tows	•052 (56)	•109 (27)	.102	•268	•027	•031

Table 18.--Catches of G-IA and G-III nets compared, all seasons, all subareas.



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